Benchmarking Report No. 07

January, 2020

Agenda

1. ***Quantitative Information***
2. *Voice Service Quality & Performance - Cairo*
3. *Data Service Quality & Performance – Cairo*
4. *Voice Service Quality & Performance - Giza*
5. *Data Service Quality & Performance – Giza*
6. *Voice Service Quality & Performance - Alexandria*
7. *Data Service Quality & Performance - Alexandria*
8. *Voice Service Quality & Performance - Delta*
9. *Data Service Quality & Performance – Delta*
10. *Voice Service Quality & Performance – Upper Egypt*
11. *Data Service Quality & Performance – Upper Egypt*
12. *Annexes*

Executive Summary

Due to the fact that **NTRA** in **Egypt** is concerned about maintaining the highest standards of the quality of the network and getting the market insight about how operators are performing in the market from a **QoS/QoE** perspective. **NTRA** along with Rohde and Schwarz carried out an extensive benchmarking survey of the Mobile networks in **Egypt** with focus on the performance of the four operator's network.

The full scope of measurements performed covers **Egypt** on monthly basis. Measurement is divided over seven main regions, Cairo, Giza, Alexandria, Delta, and Upper Egypt. Each area is consists of some clusters that will be measured during each month. And the results of each month will be discussed on this presentation.

This presentation gives a summary view of **January-20** measurements that took place in January 2020 for **Egypt** as defined in later slides of this presentation, during this survey, a distance of ~ **20,638 KM's** were driven. All measurements were done in Window time from 8AM to 8PM.

This presentation addressed 2nd, 3rd and 4th generation mobile networks (2G,3G,4G) for the Four licensees **Etisalat**, **Orange**, **Vodafone** and **WE** (sorted alphabetically) in outdoors measurements. Key performance indicators used in the survey are included in Annexes slides at the end of this presentation. For this campaign, Mobile to Mobile voice scenario approach was followed to better represent customer experience in a modernized manner.

Quantitative Information

Voice Measurements	Number of Tests
Total Number of Voice Calls	58,486

Data Measurements	Number of Tests
HTTP Download	65,038
HTTP Upload	64,694
HTTP Browsing - Facebook	64,757
HTTP Browsing - Twitter	64,600
HTTP Browsing - Google	64,847
HTTP Browsing - YouTube	64,808
HTTP Browsing - Yahoo	64,659
YouTube - Video Stream	64,491
Total Ping Attempts	2,983,964

Methodology

NTRA has preformed drive test that cover all governorates and major highways across the country. The tests were in same time and condition for the four operators to ensure fair comparison.

NTRA measures the major “key performance indicators” (**KPI**) that directly relate to the public’s experience through Outdoor (in-car user experience). These include block, dropped calls, voice quality, data throughput. (all details will be found on annexes slides)

The drive test results represent a snapshot of the mobile service provider’s network in-car user experience and using a particular type of smartphones to simulate end user. The reported level of service quality may therefore not be exactly comparable with the consumer’s own experience;

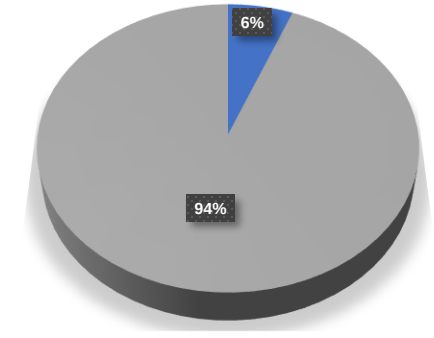
The threshold for each **KPI** in license is mentioned in the legend of each graph. (and it is included in the annexes slides)
For better understand the results in reference to the threshold value:

- Every result exceeds the threshold value is considered as a violation to the license terms for **Voice KPI’s**.
- Every result exceeds the threshold value is considered as a violation to the license terms for **Data KPI’s** except for **Download Throughput** and **Upload throughput**.
- **Download Throughput** and **Upload throughput** violation counted when the result is lower than the threshold value.
- We Denotes the violations where penalties are applied as dashed **Dark RED** Line
- We Denotes the violations where penalties are not applied as Solid **Black** Line

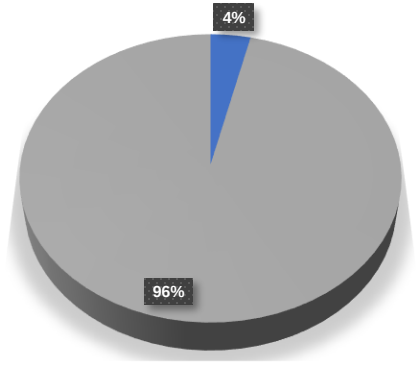
Executive Summary

Licensed-KPI's Violation Percentage over Egypt (27 zones * 8 KPIs in license = 216 possible violations)

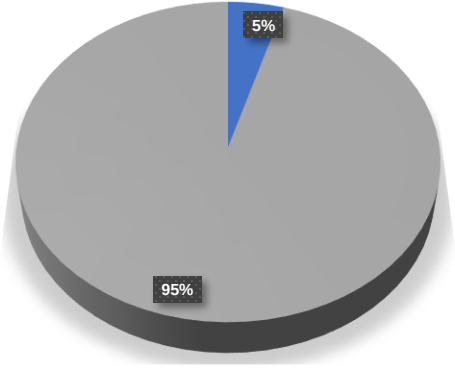
vodafone



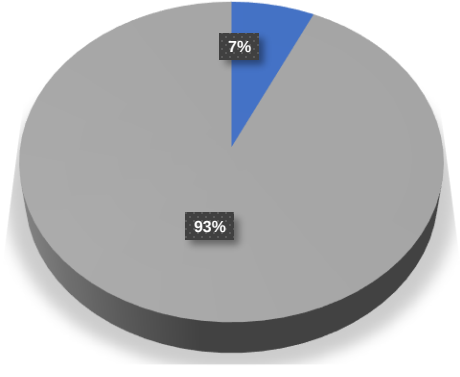
orange



etisalat

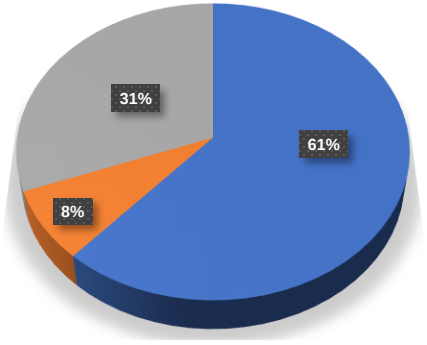


we



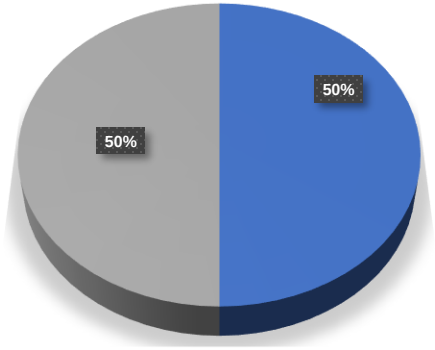
Licensed-KPI's Violation Breakdown Over Egypt

vodafone



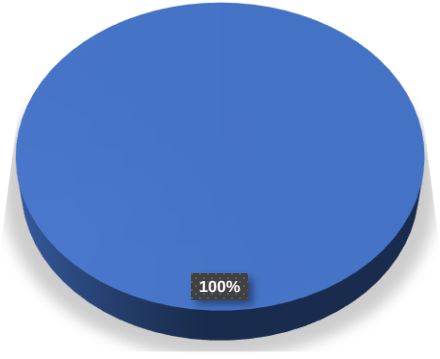
Call blocked Rate Call Dropped Rate MOS < 2.8

orange



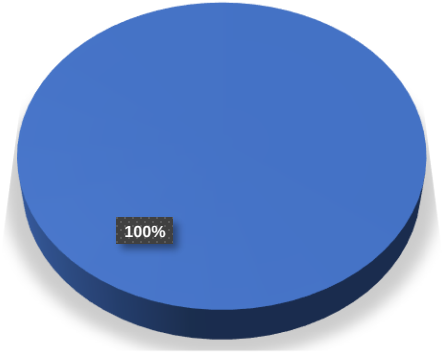
Call blocked Rate MOS < 2.8

etisalat



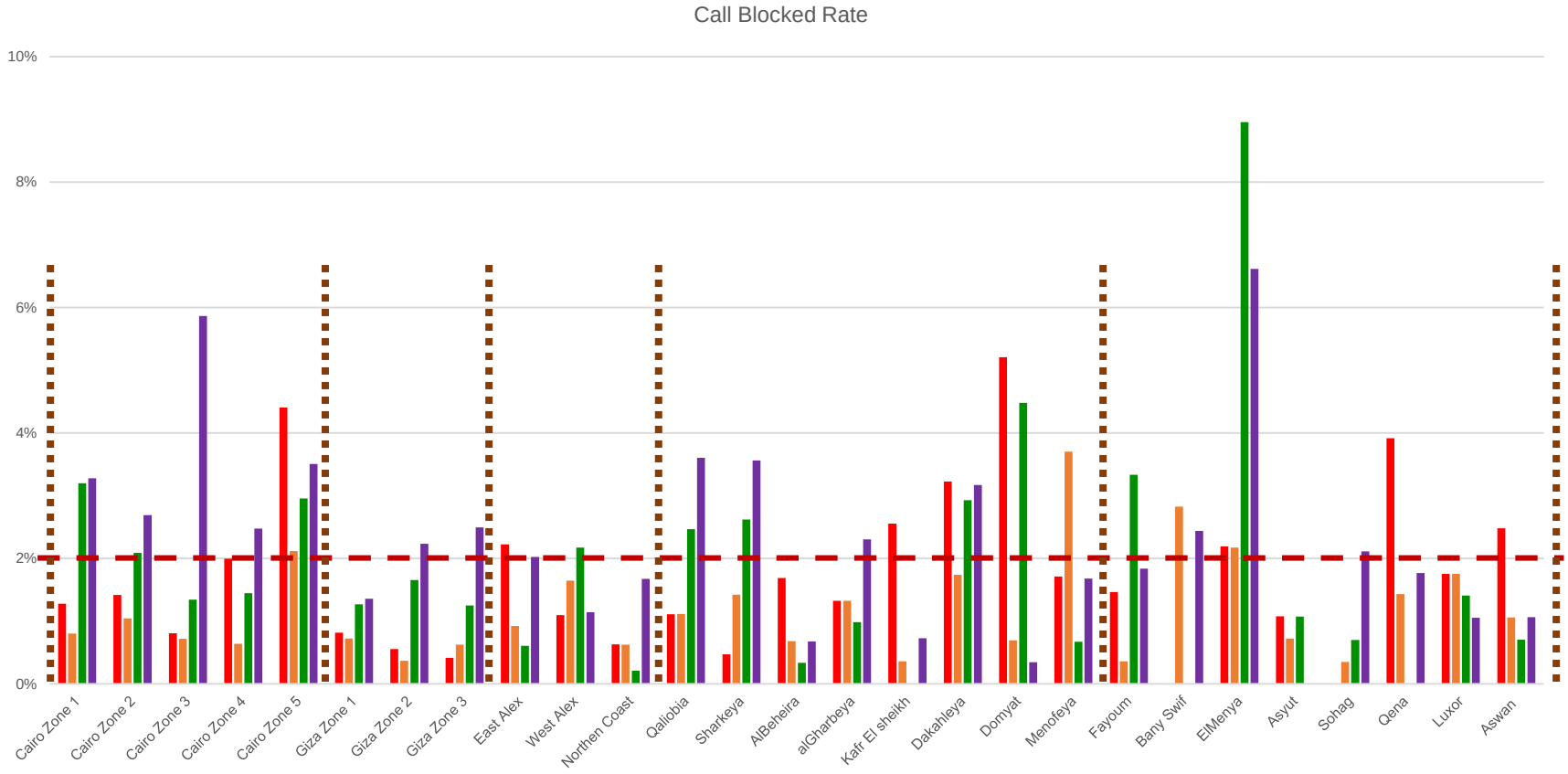
Call blocked Rate

we

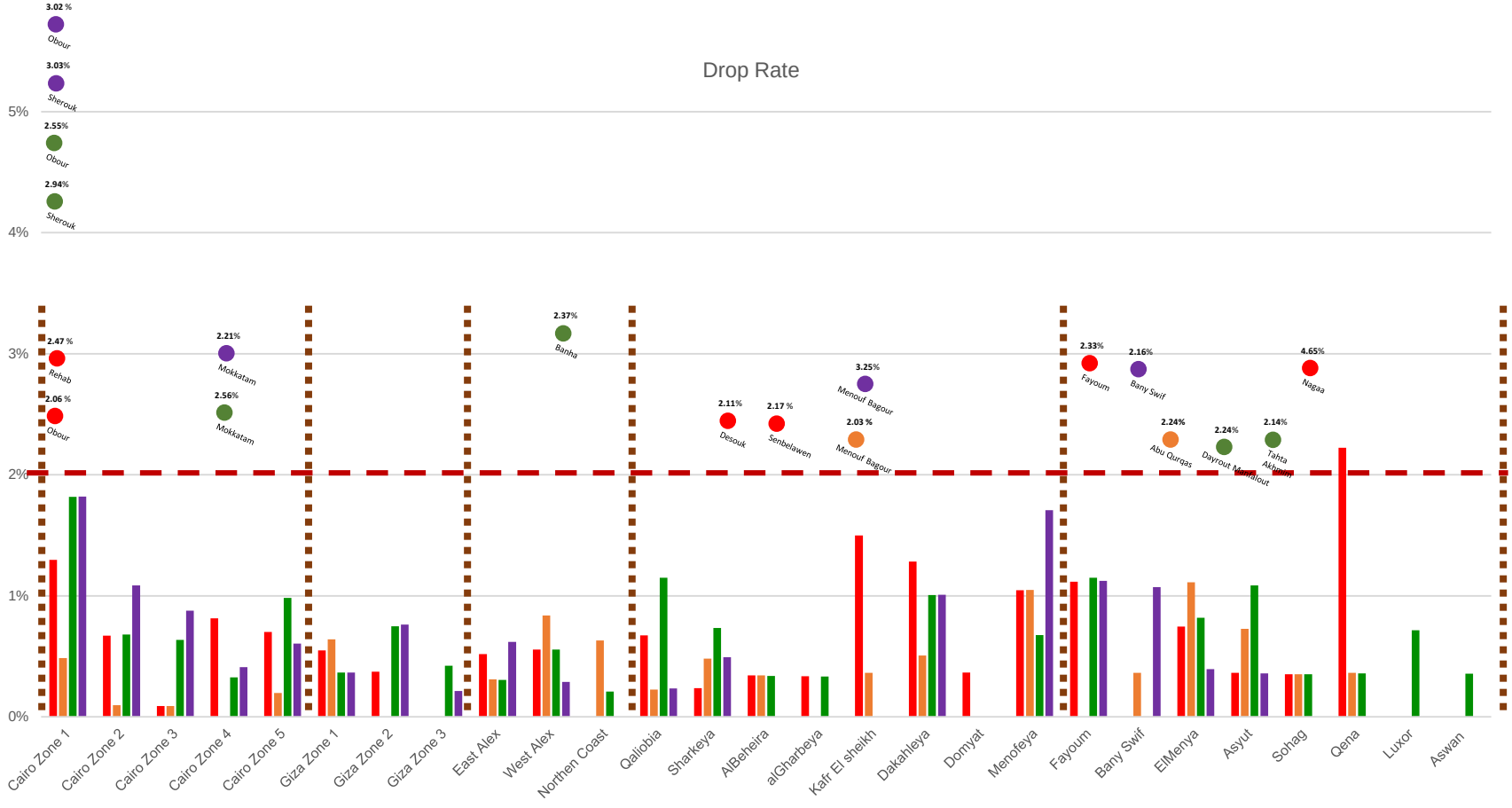


Call blocked Rate

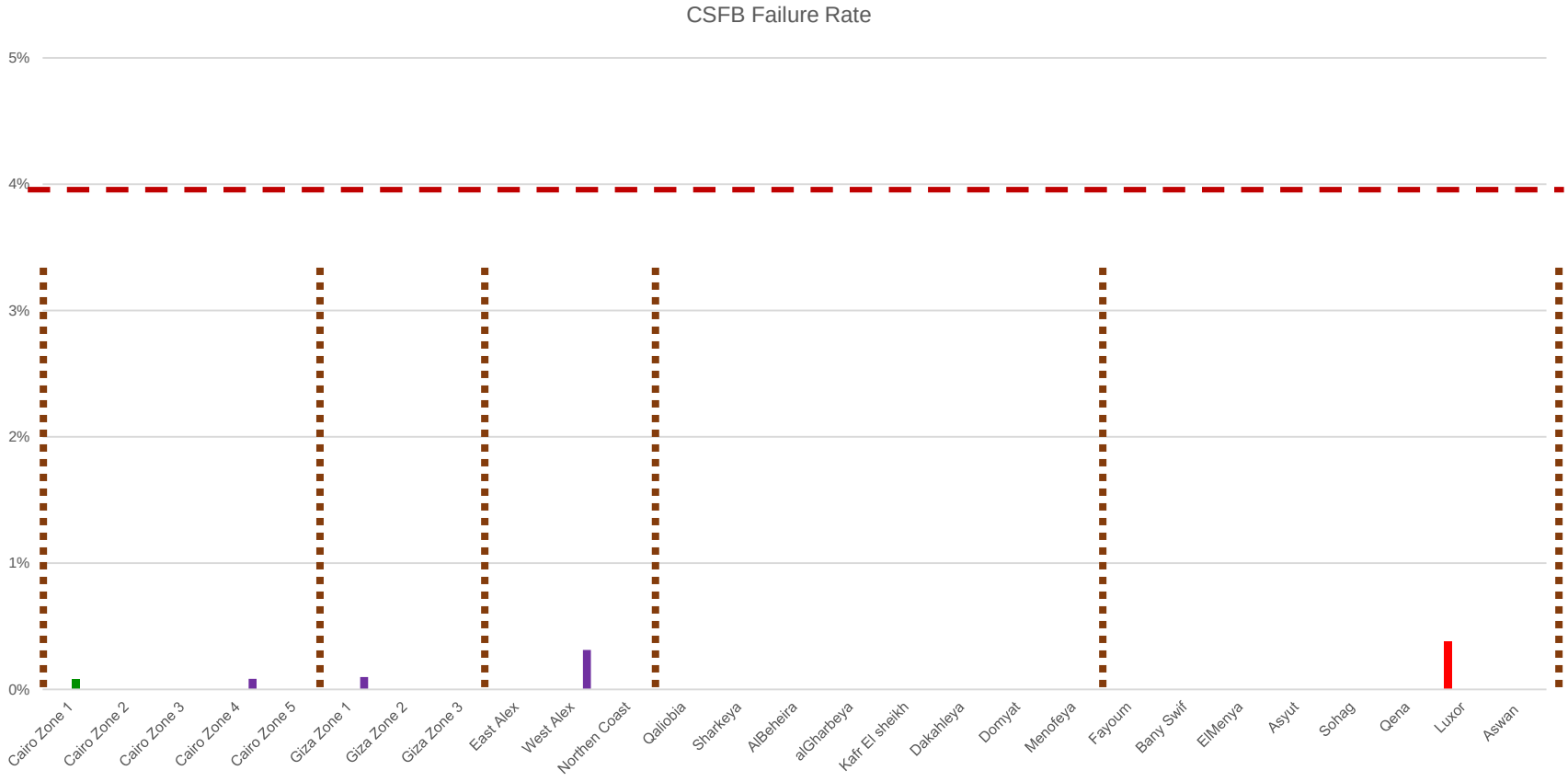
Call Blocked Rate - Zones



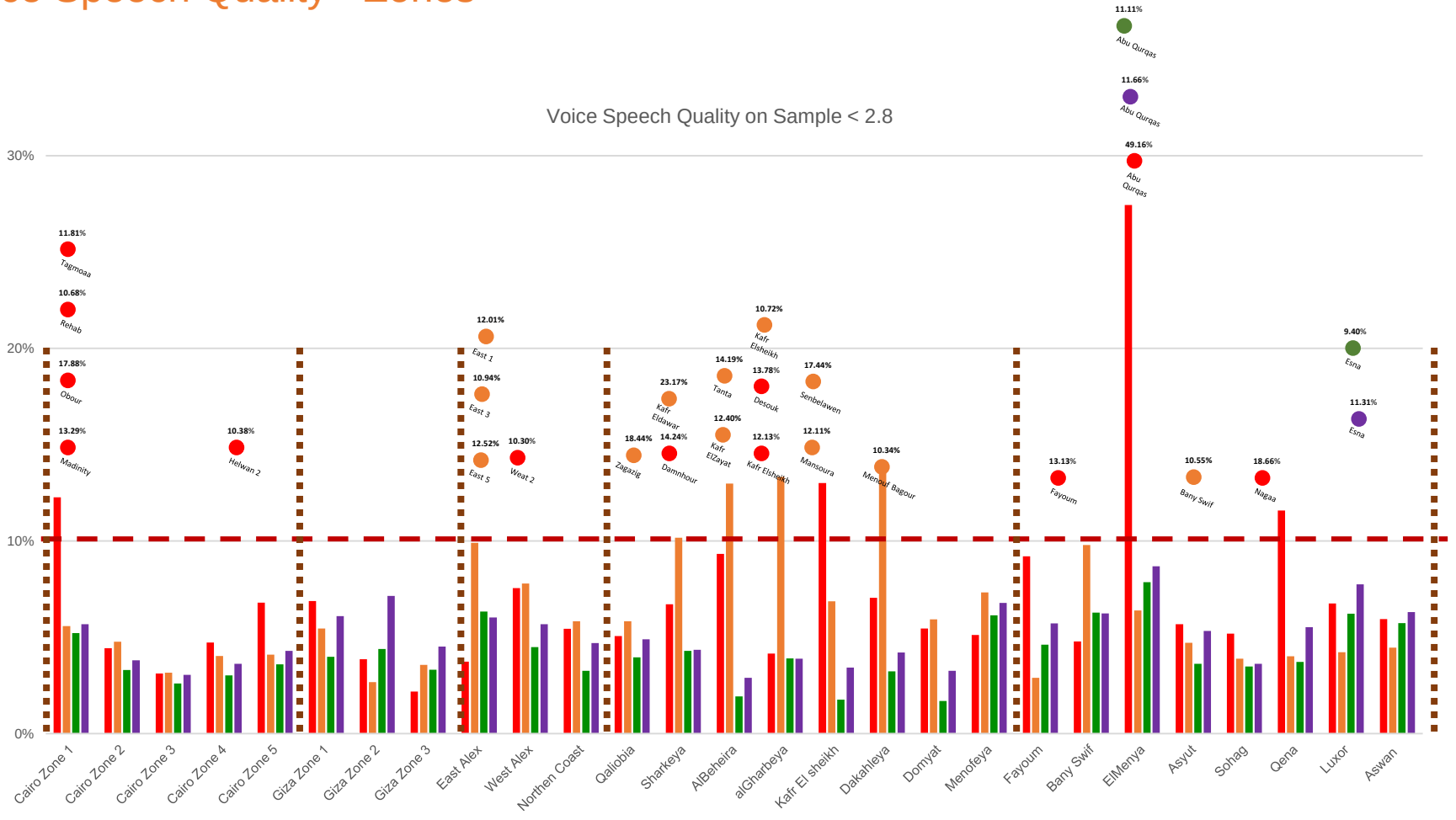
Call Dropped Rate - Zones



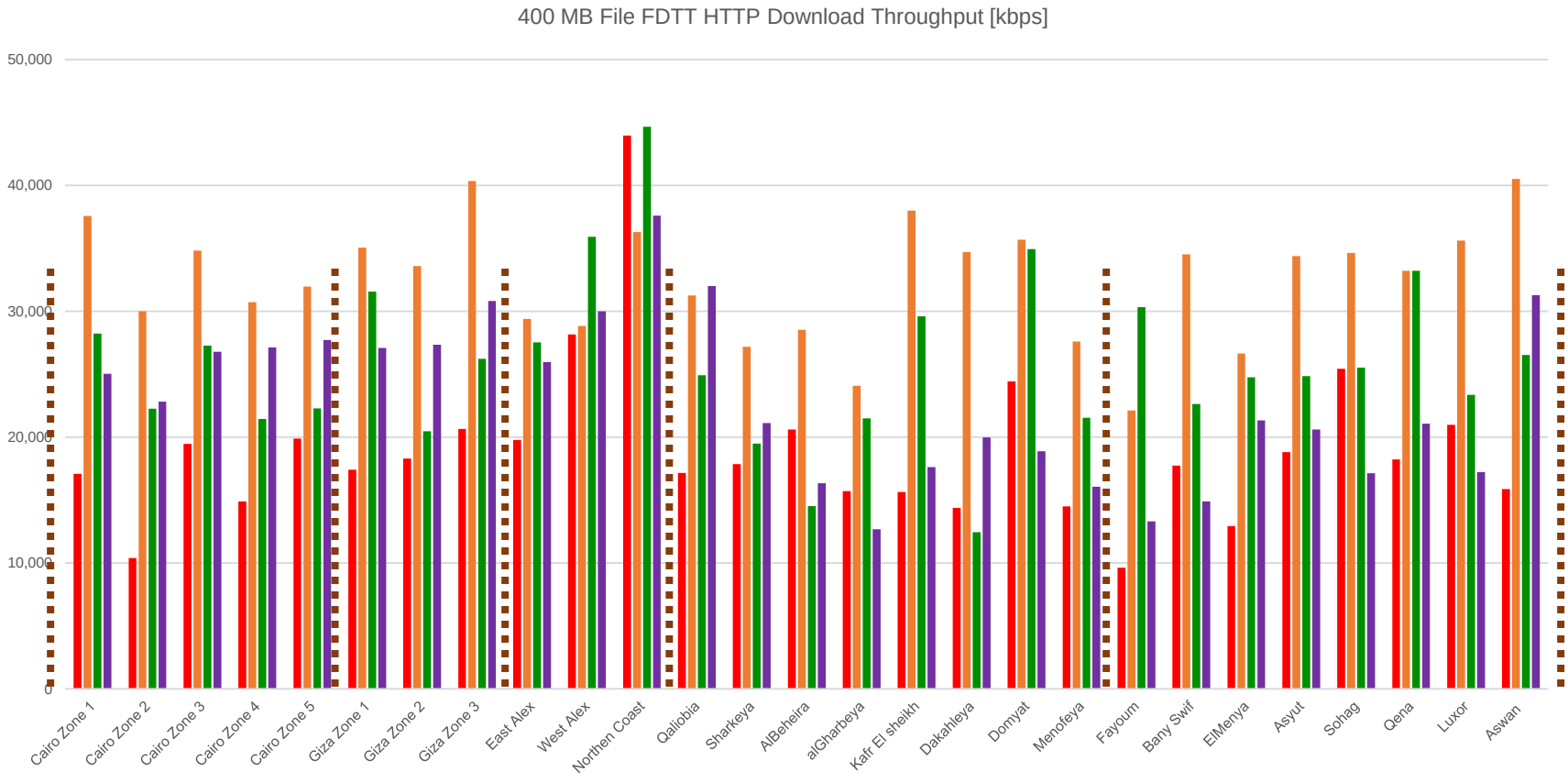
CSFB Failure Rate - Zones



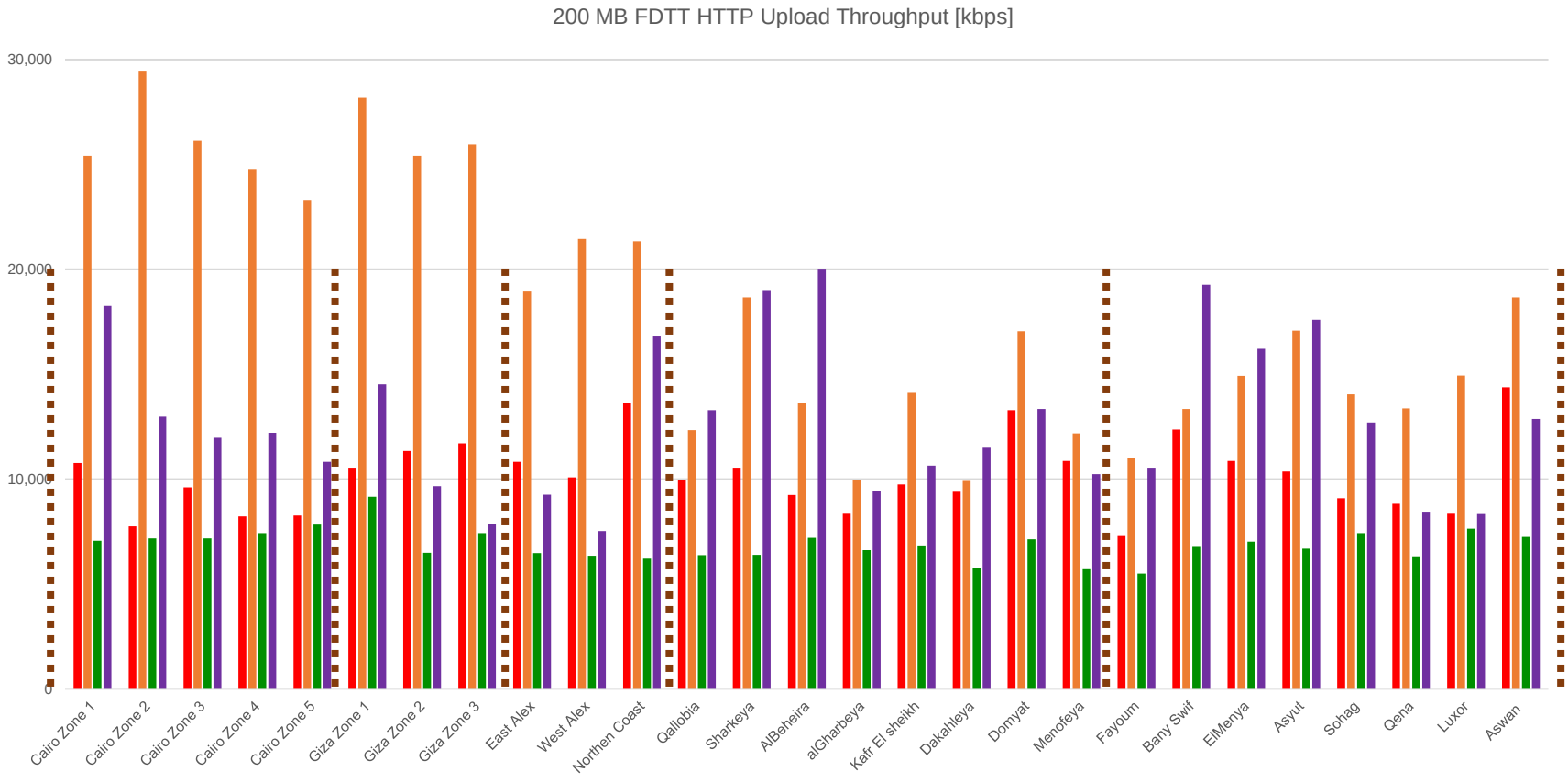
Voice Speech Quality - Zones



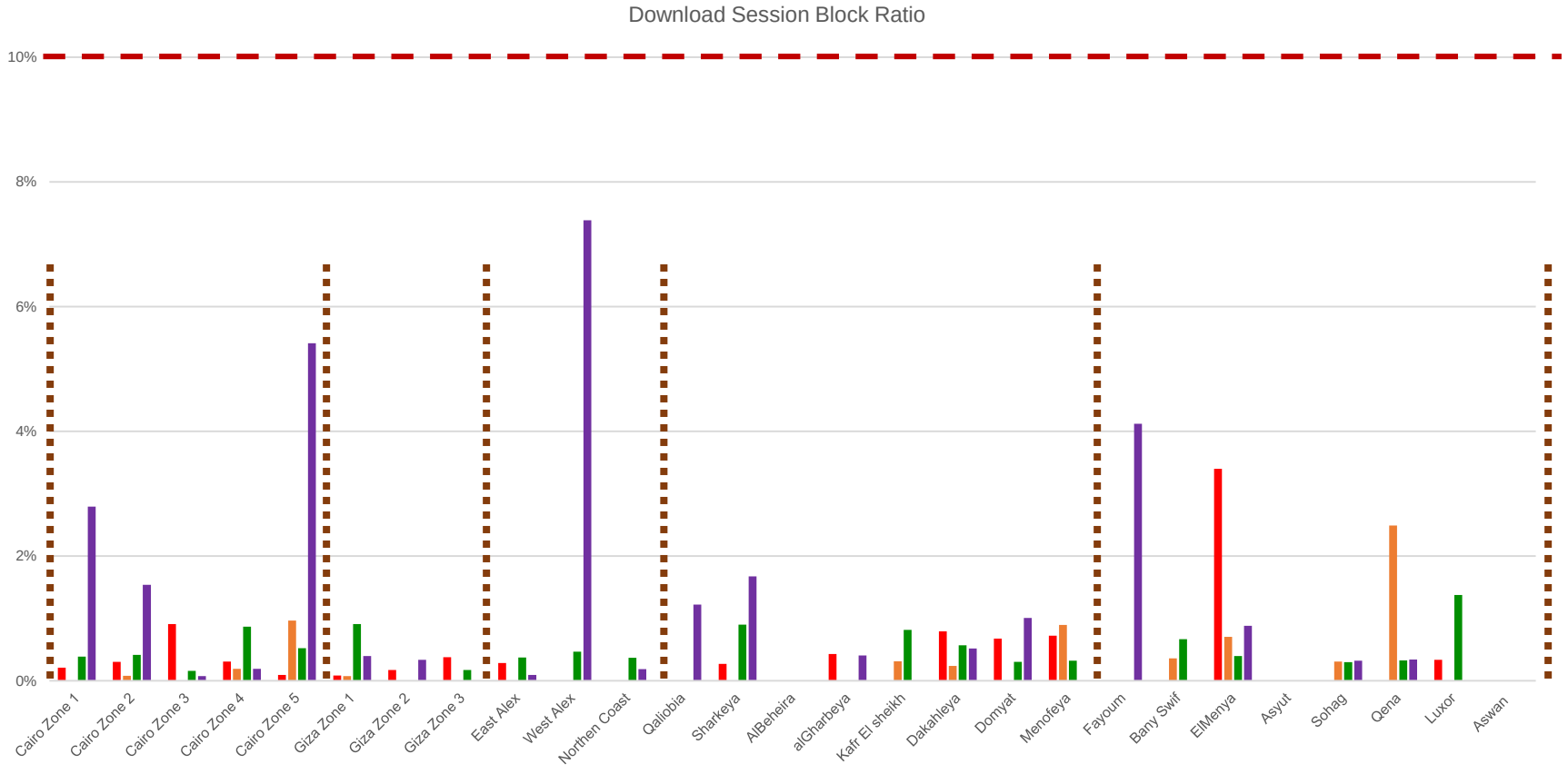
Download Throughput [kbps] - Zones



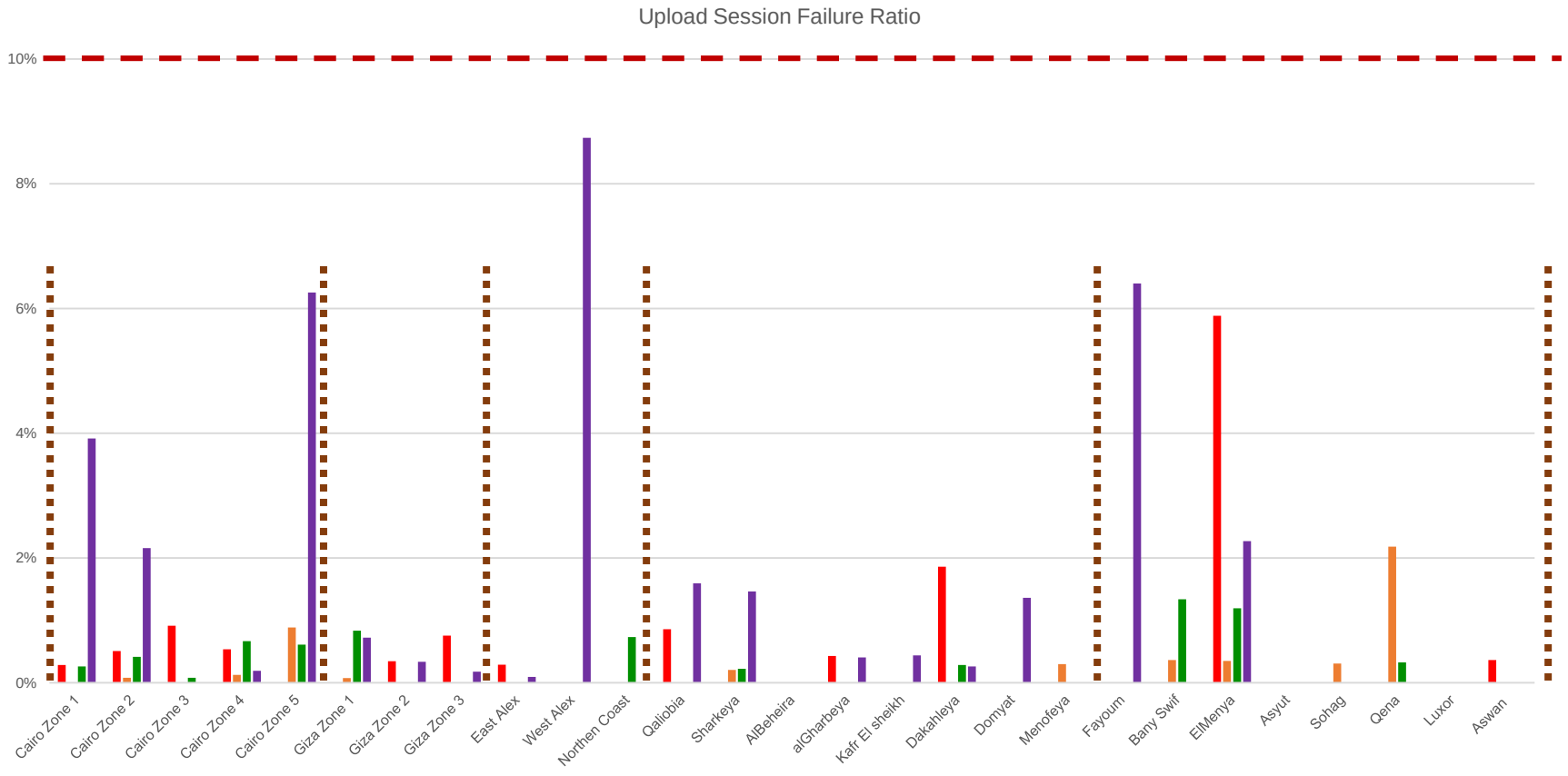
Upload Throughput [kbps] - Zones



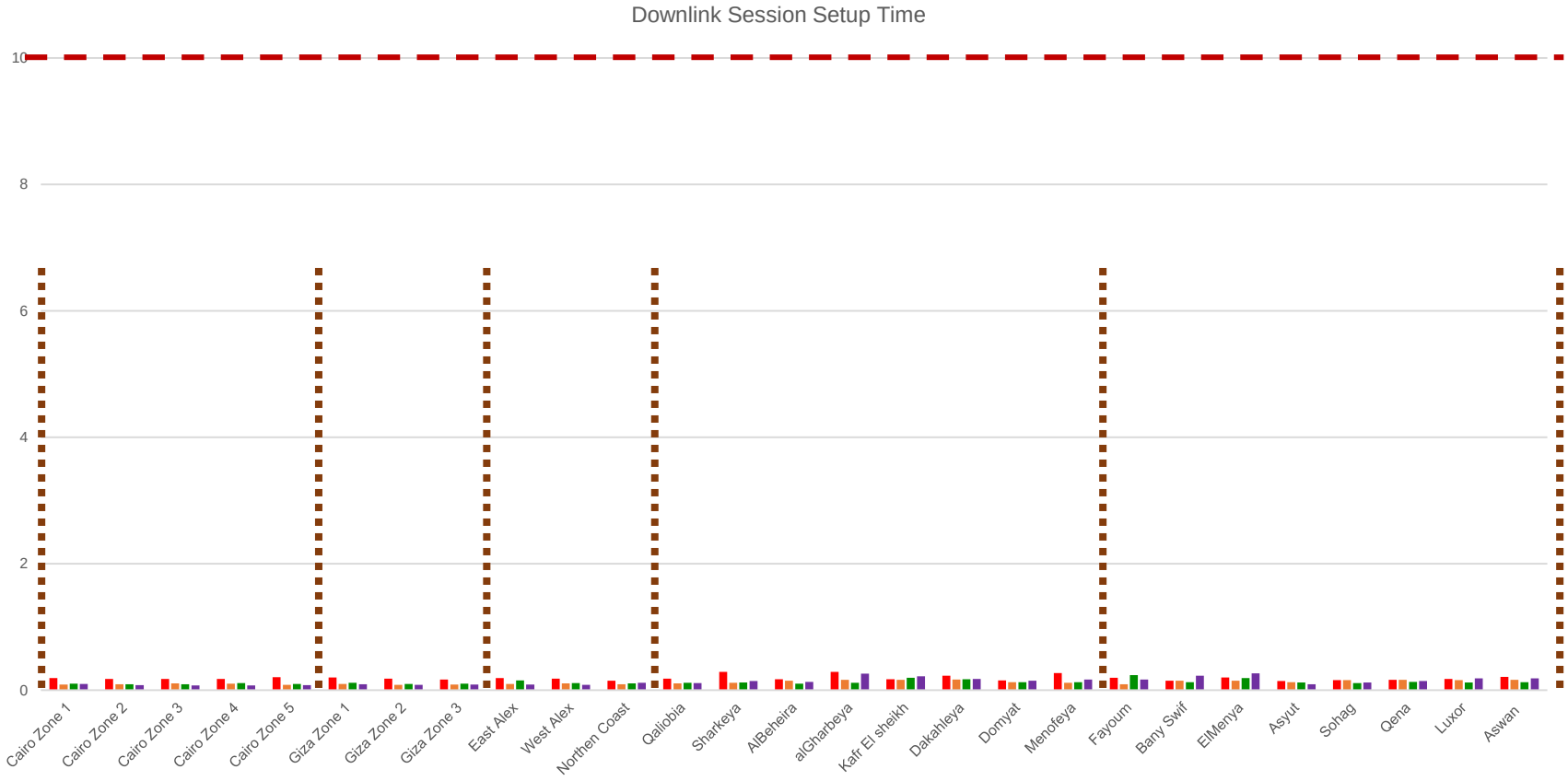
Download Session Blocked Ratio - Zones



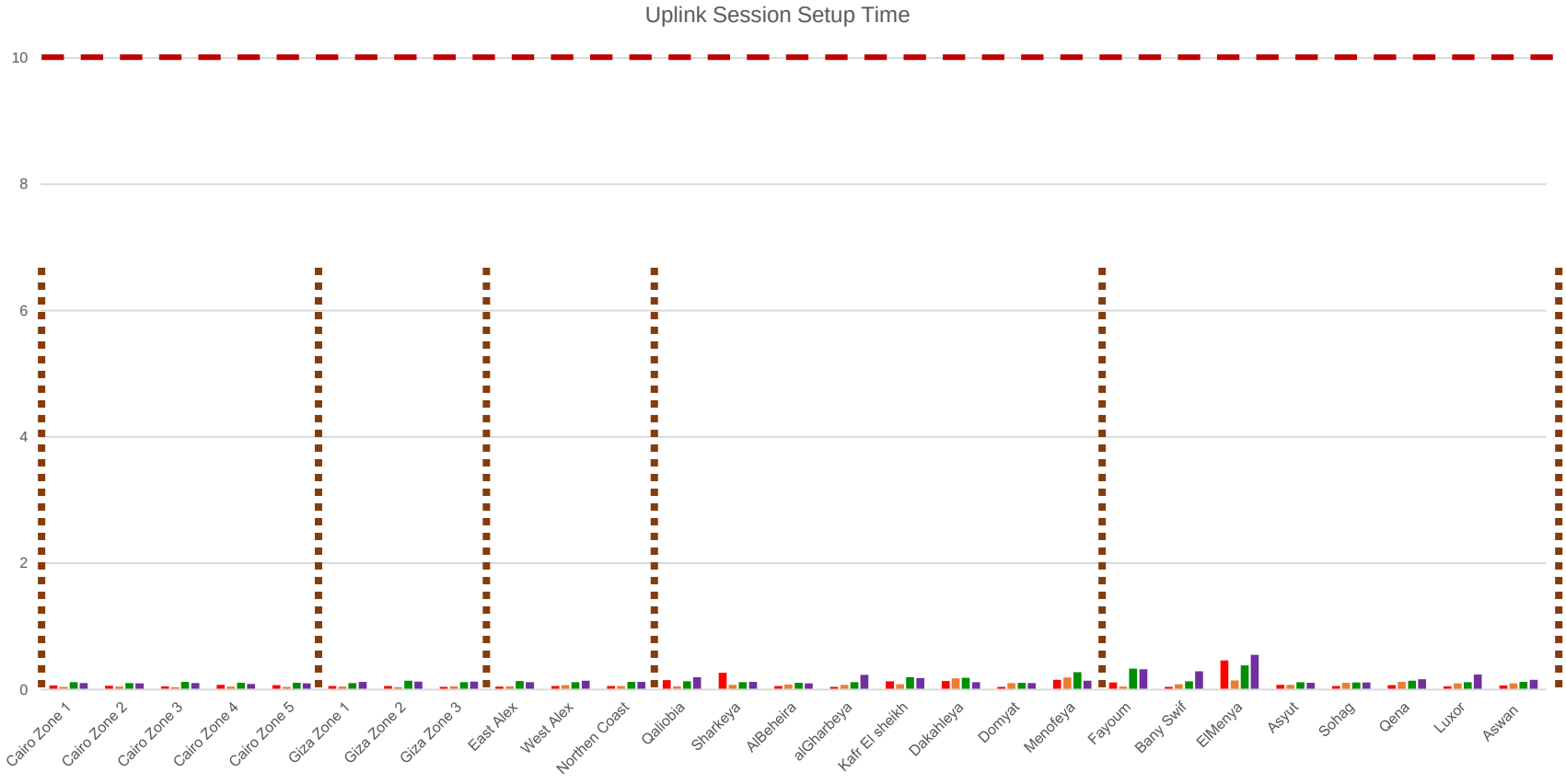
Upload Session Blocked Ratio - Zones



Download Session Setup Time - Zones



Upload Session Setup Time - Zones



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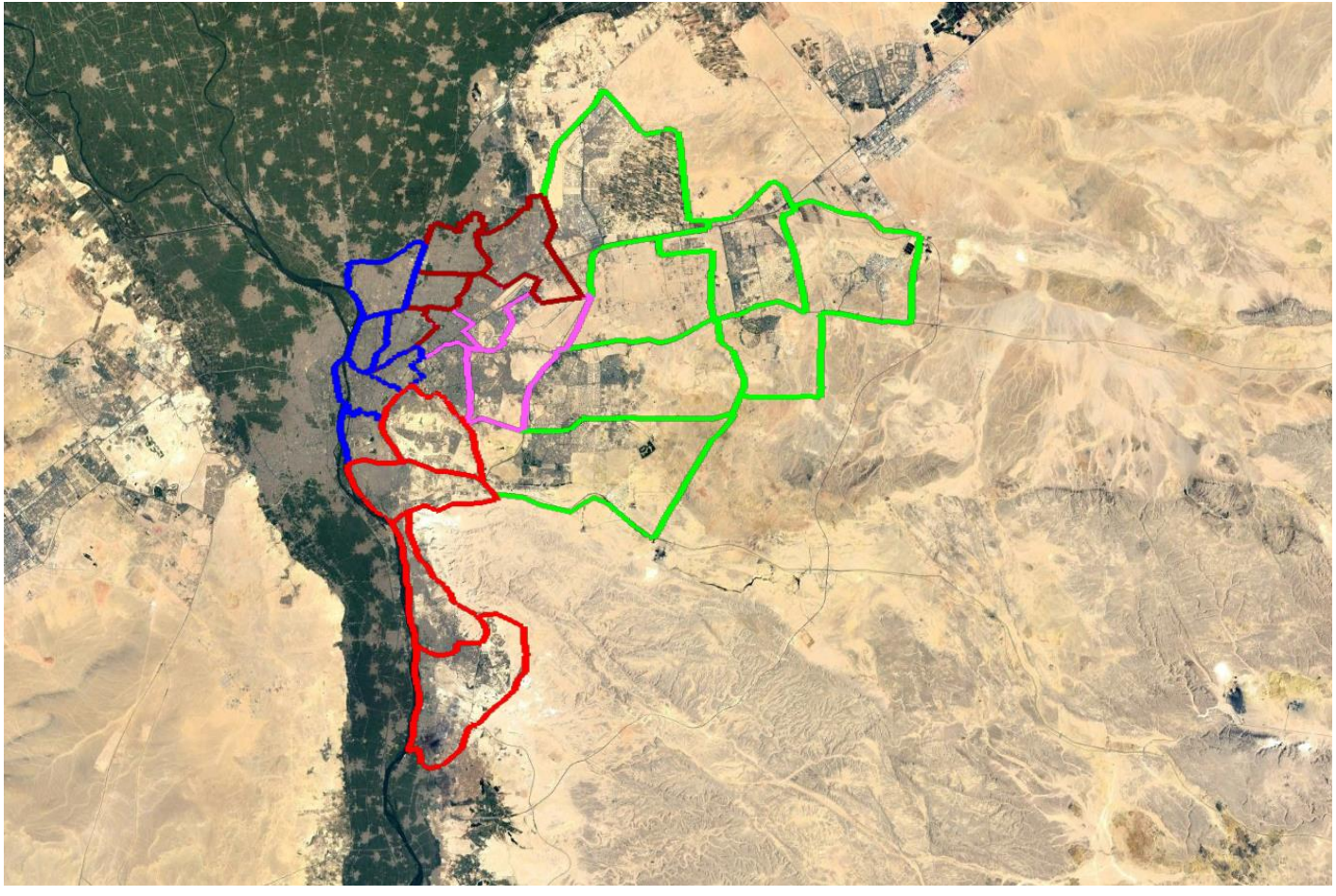
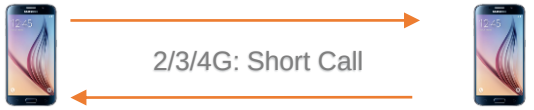
Zones Definition

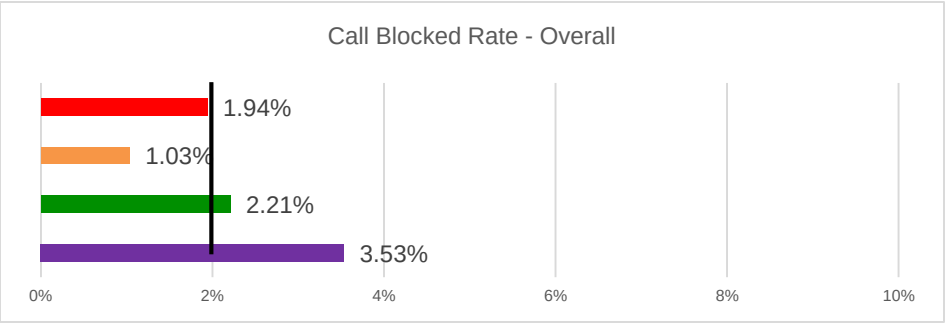


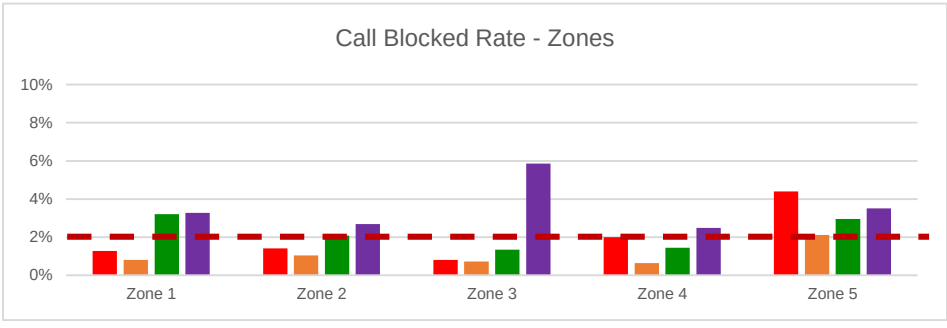
Cairo	
Cairo Z1	Madinity Obour Rehab Sherouk Tagamoaa
Cairo Z2	Heliopolis 1 Heliopolis 2 Nasr City 1 Nasr City 2
Cairo Z3	Ain Shams ElMarg ElSalam Qobba Gardens
Cairo Z4	Abbasia AlManyal Shobra Shobra ElKhamia Zamalek
Cairo Z5	Helwan 1 Helwan 2 Maadi Mokattam

Voice Service KPI’s

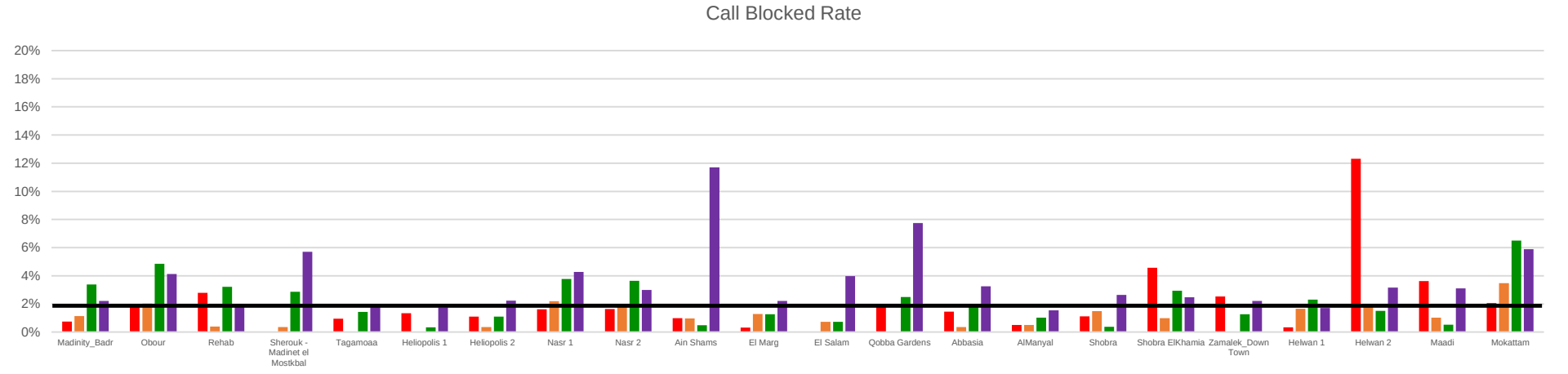
Accessibility: Call Blocked Rate



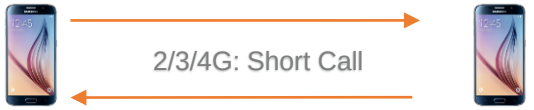


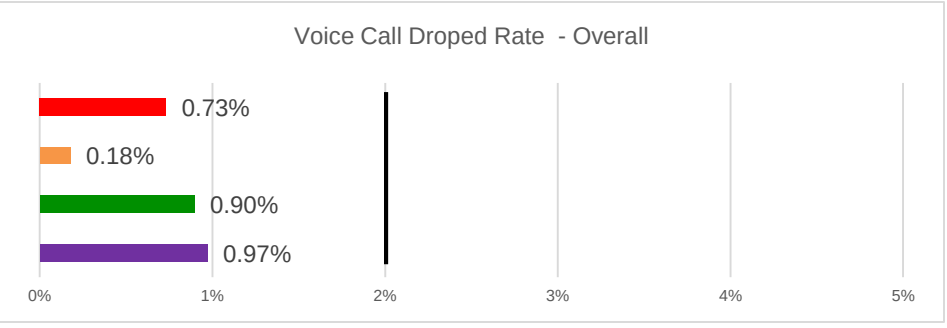


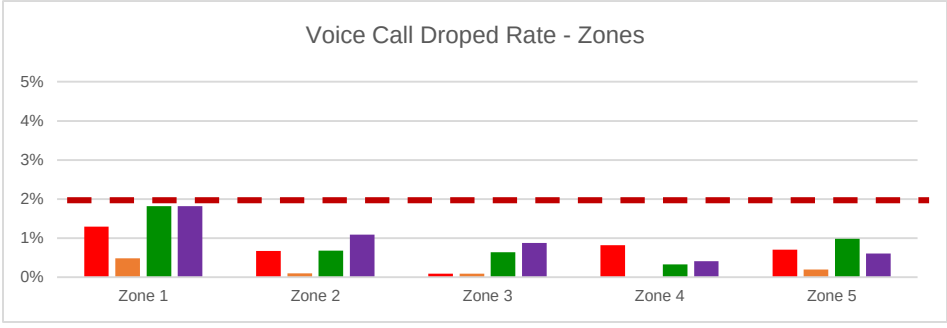
Call Blocked Rate *represents the ratio between unsuccessful call attempts and all calls made (both successful & unsuccessful).*



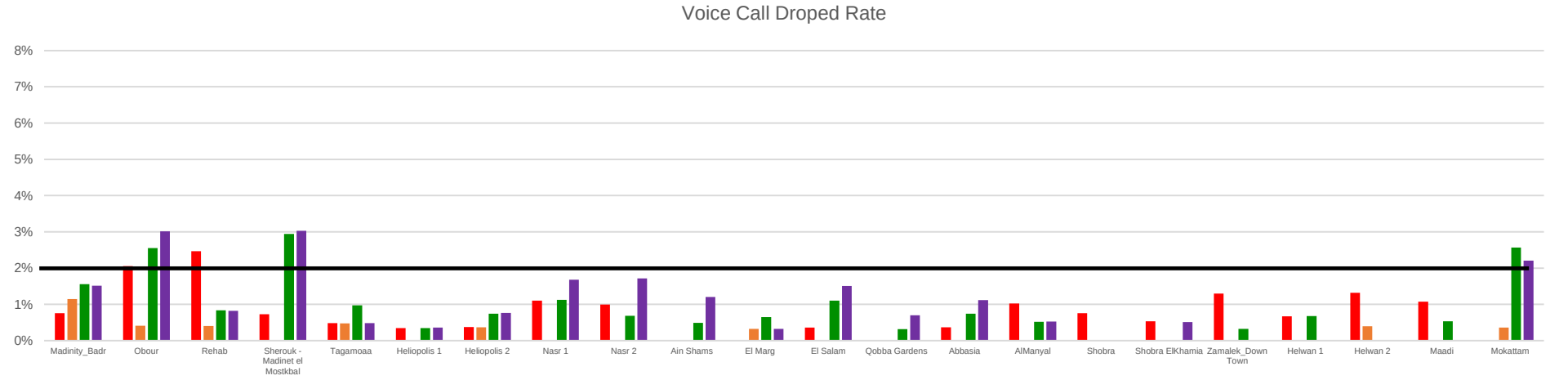
Retainability: Call Dropped Rate



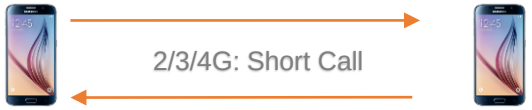


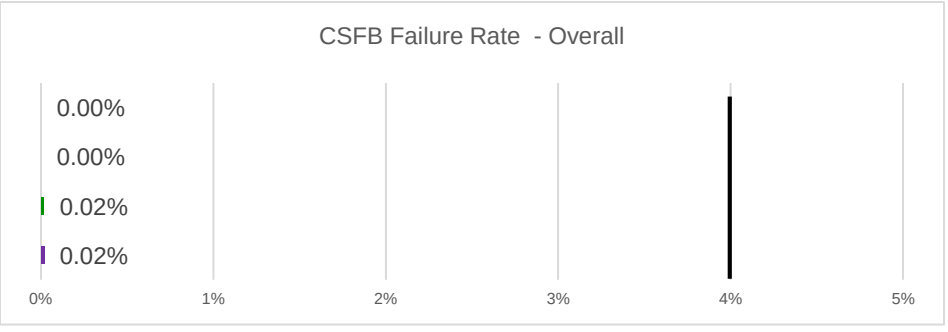


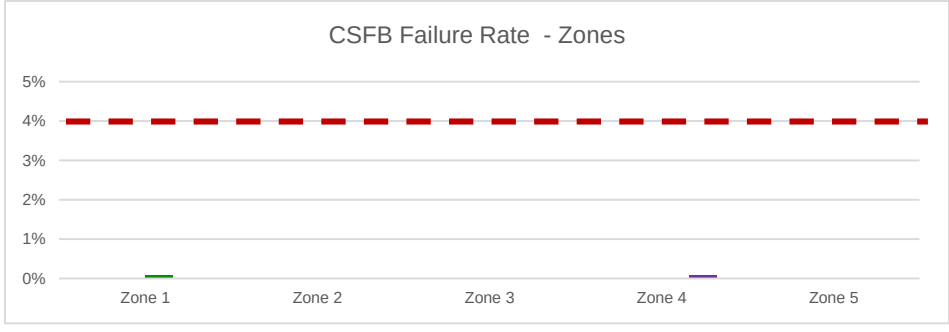
Voice Call Retainability *is represented by call drop rates.*



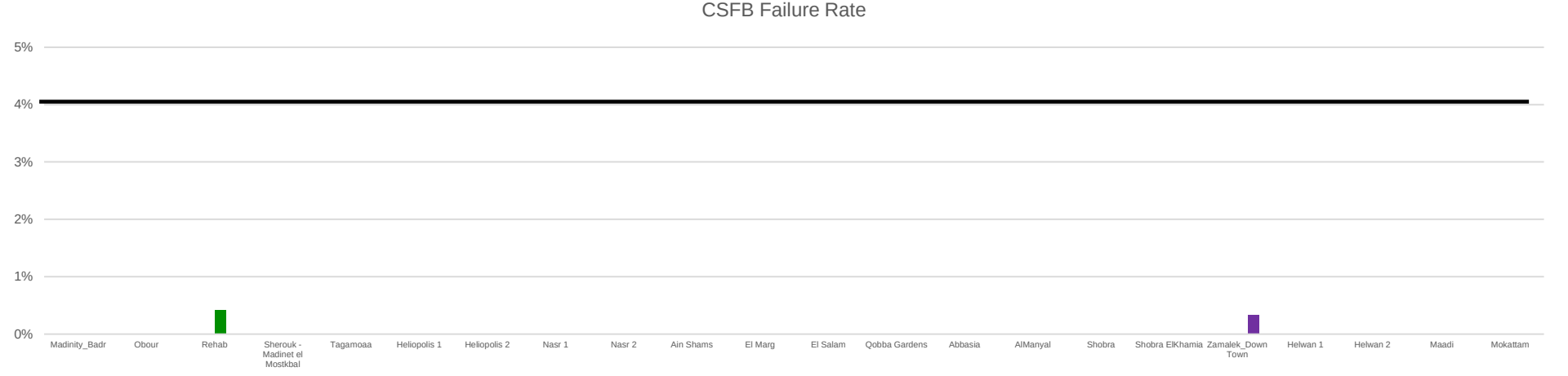
Accessibility: CSFB Failure Rate [%]



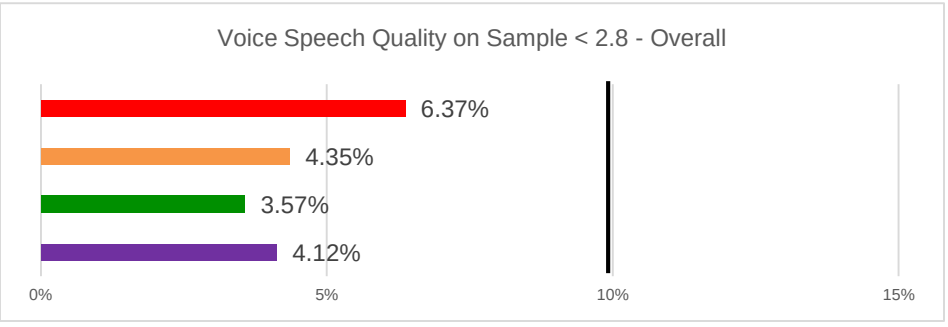


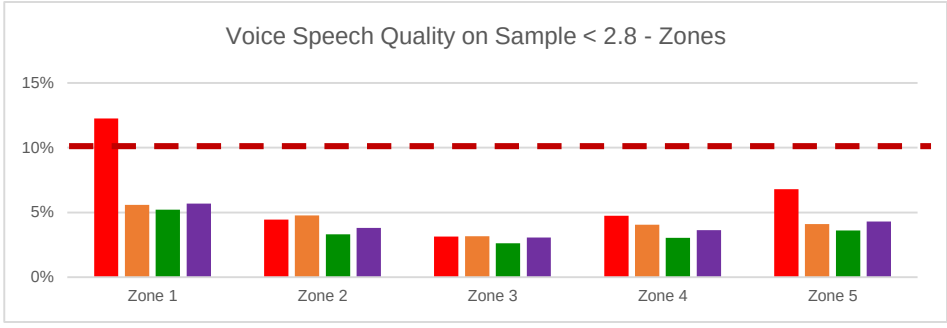


CSFB Failure Rate *represents the ratio between unsuccessful fall back attempt to lower technology than 4G (LTE) and all calls made (both successful & unsuccessful). When there is 4G (LTE) present before starting the session.*

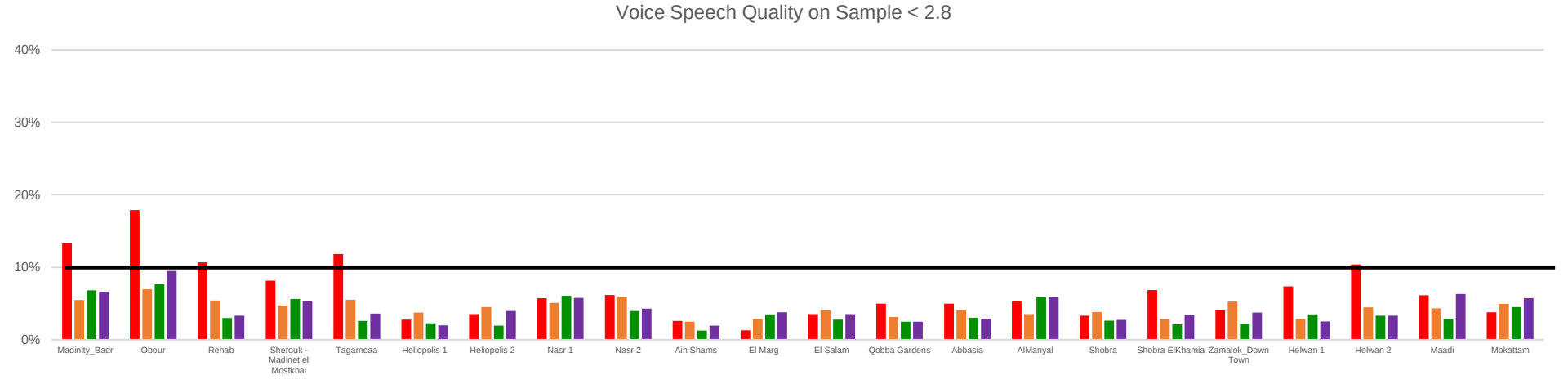


Speech Quality: MOS Voice Speech Quality < 2.8

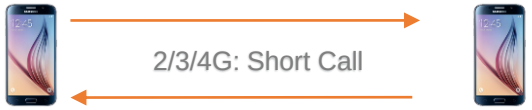


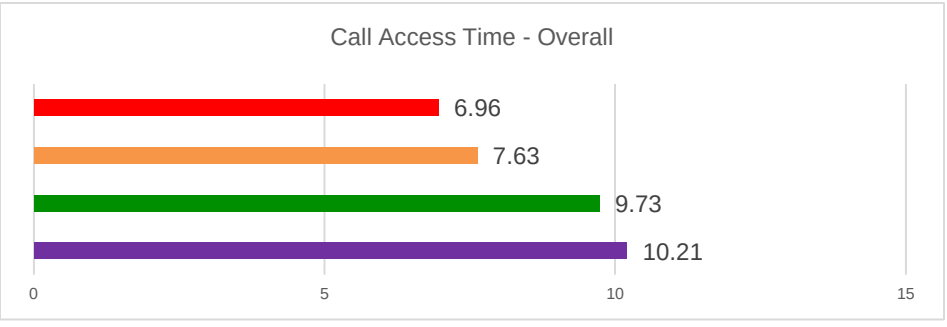


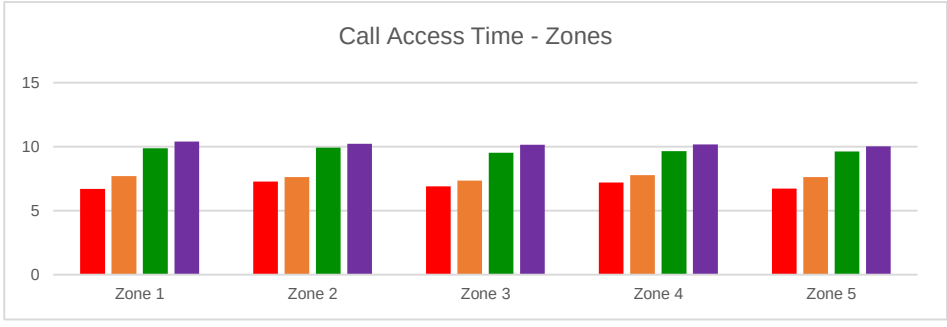
MOS Voice Speech Quality < 2.8 *represents the ratio between total number of MOS samples less than 2.8 all collected MOS samples*



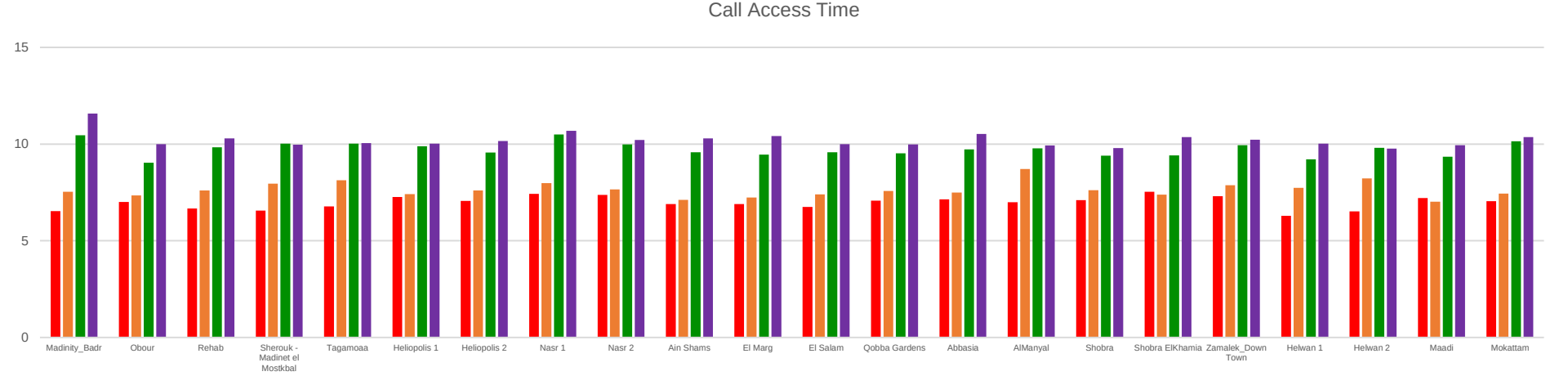
Accessibility: Call Access Time [sec.]



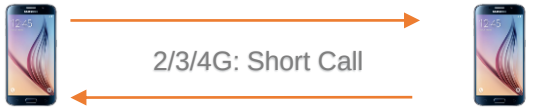


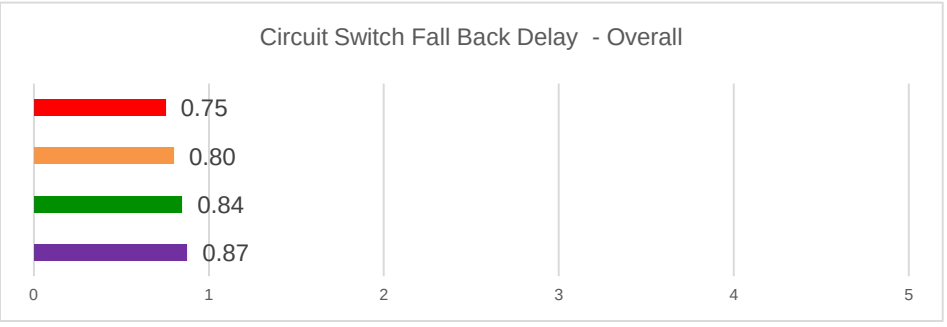


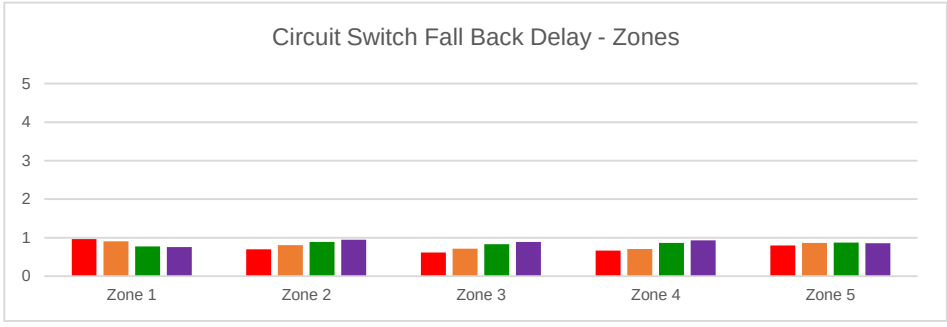
Call Access Time *represents the period of time elapsed from the sending of a complete destination address (target number) to the setting up of a call to the receiving terminal*.



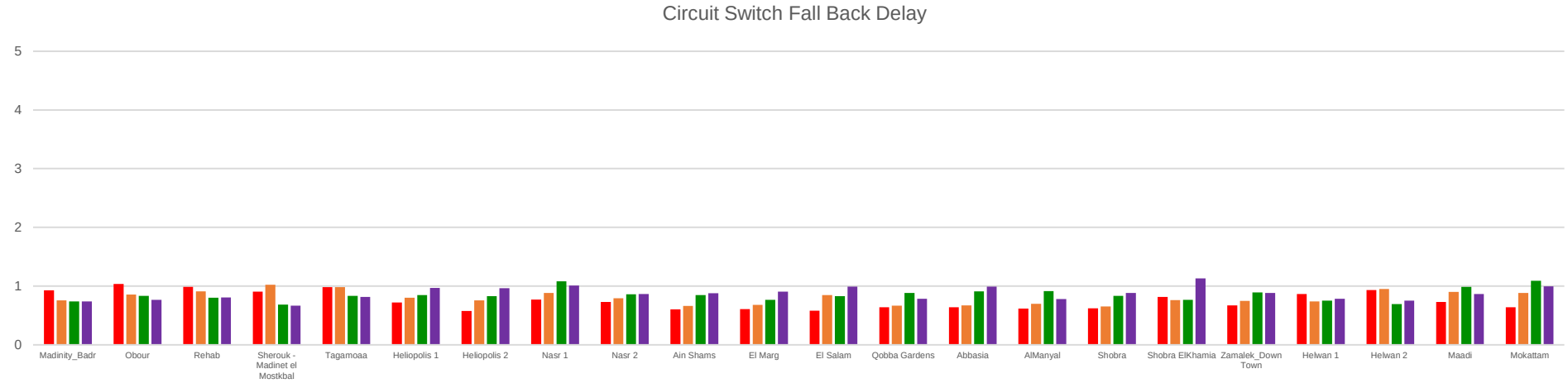
Accessibility: CSFB Delay [sec.]



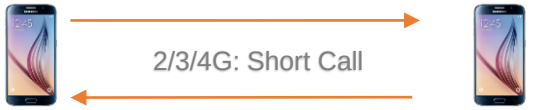


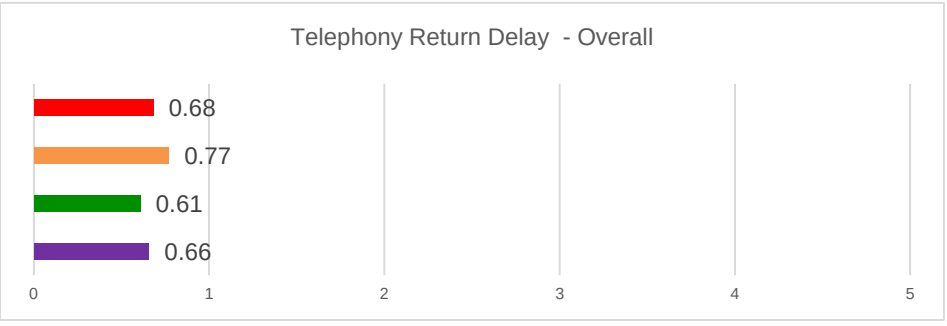


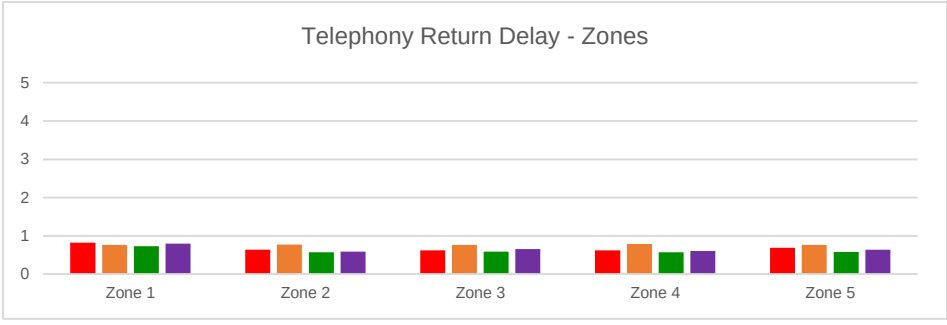
CSFB Delay *represents the period of time to overlay 3G/2G environment instead of handling calls in 4G (LTE). Depending on the CSFB strategy.*



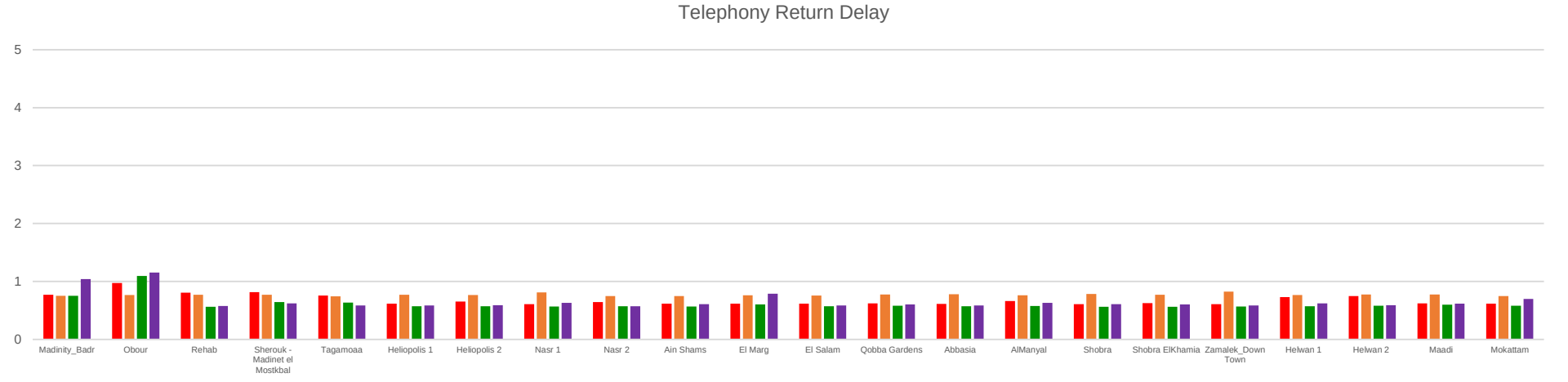
Accessibility: Telephony Return Delay [sec.]





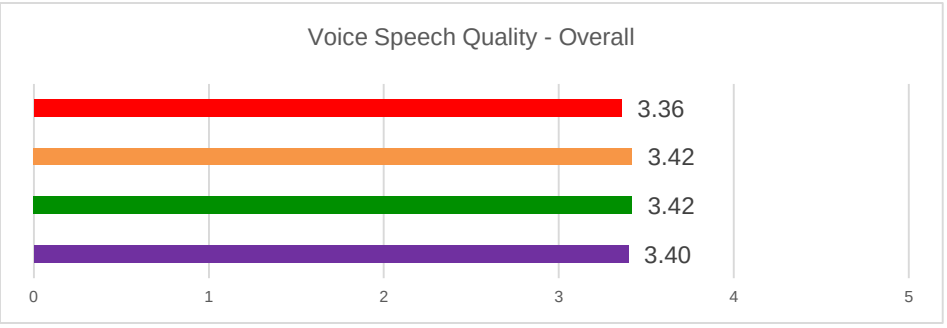


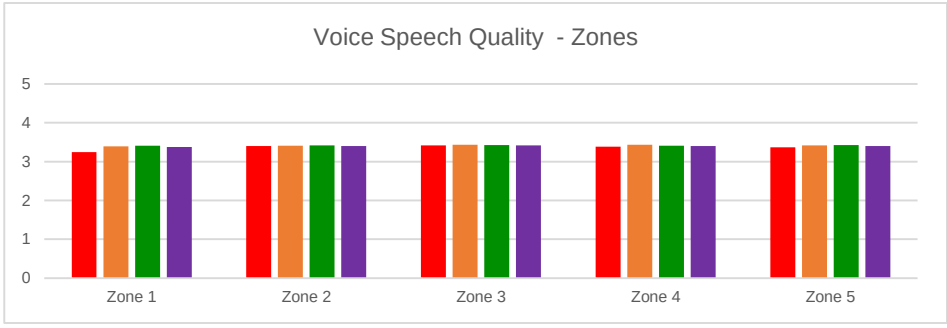
Telephony Return Delay *measures the time that a UE uses to re-join the LTE (4G) network after call end*

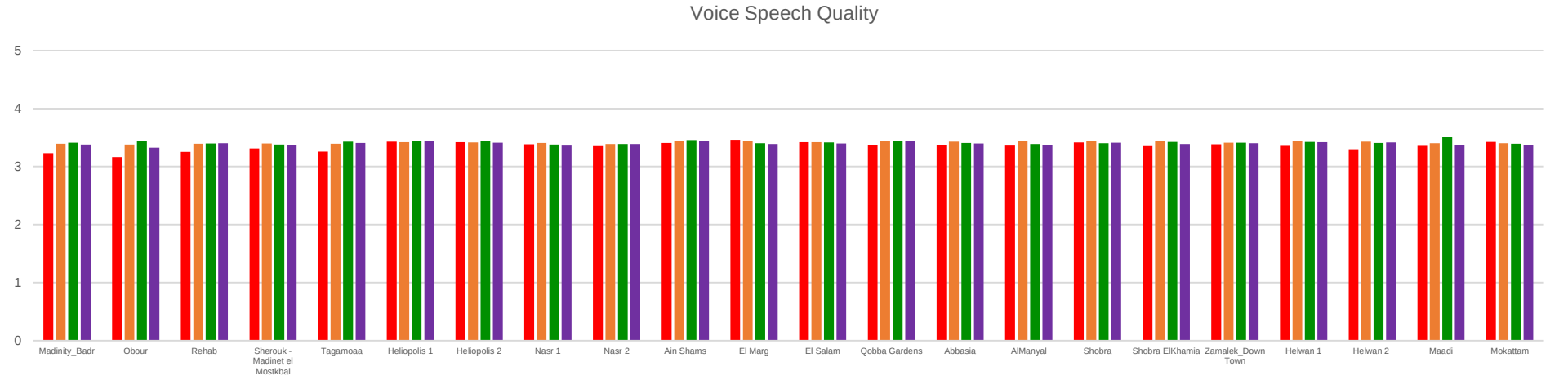


Voice Speech Quality KPI’s

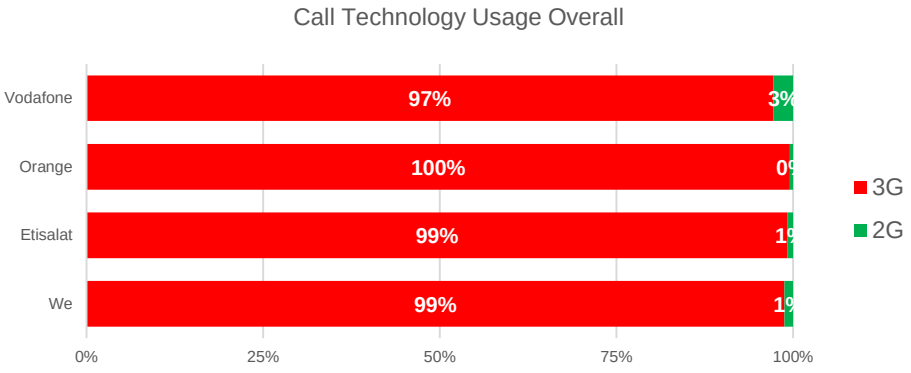
Speech Quality: MOS Scores





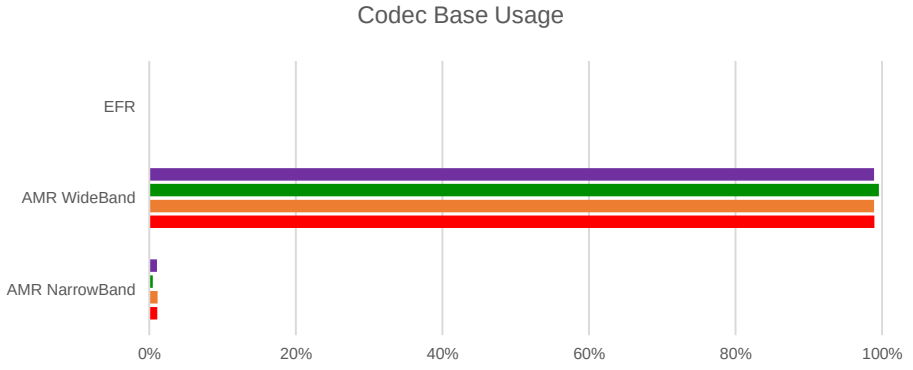


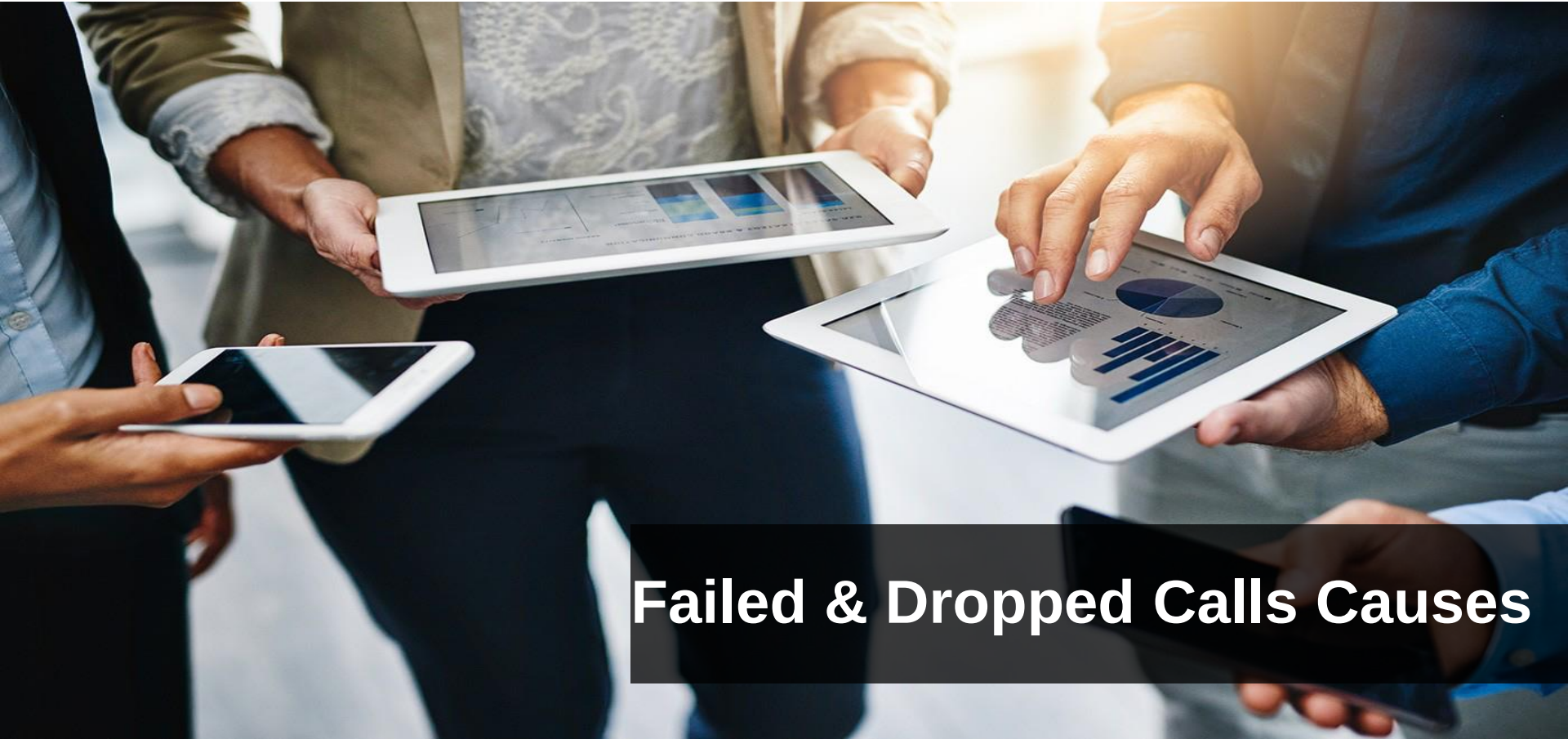
Speech Quality: Call technology Usage & Codec Base Usage



Call technology Usage *represents the call technology used over call period. The more calls on 3G (UMTS) the better MOS served.*

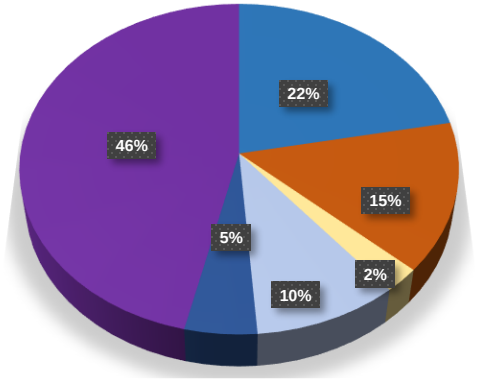
Codec Base Usage *represents the codec used over the call where AMR wideband (AMR WB) leads to better voice quality experience by the end user than the AMR Narrowband (AMR NB)*




Failed & Dropped Calls Causes

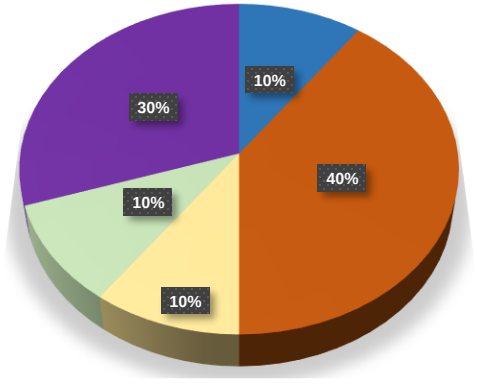
Analysis: Dropped Calls Causes

vodafone



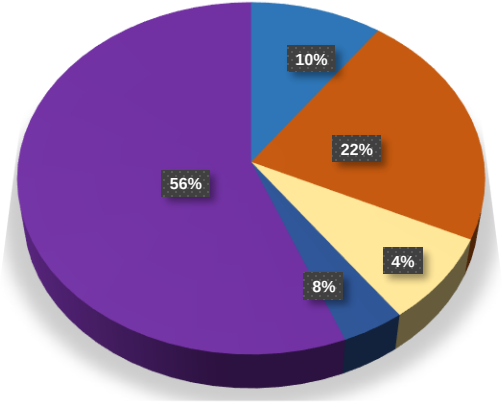
2G Quality
3G Quality
core network
Mobility Issue
No Service
RAN Issue

orange



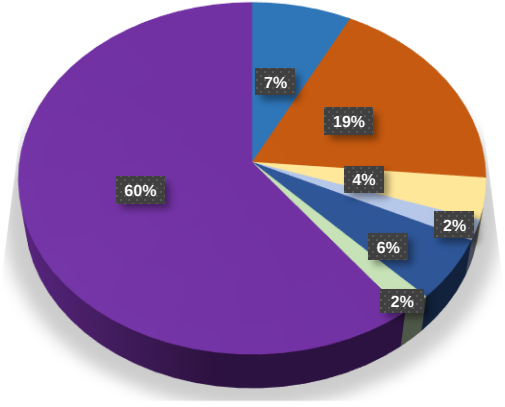
2G Quality
3G Quality
core network
Other
RAN Issue

etisalat



2G Quality
3G Quality
core network
No Service
RAN Issue

we

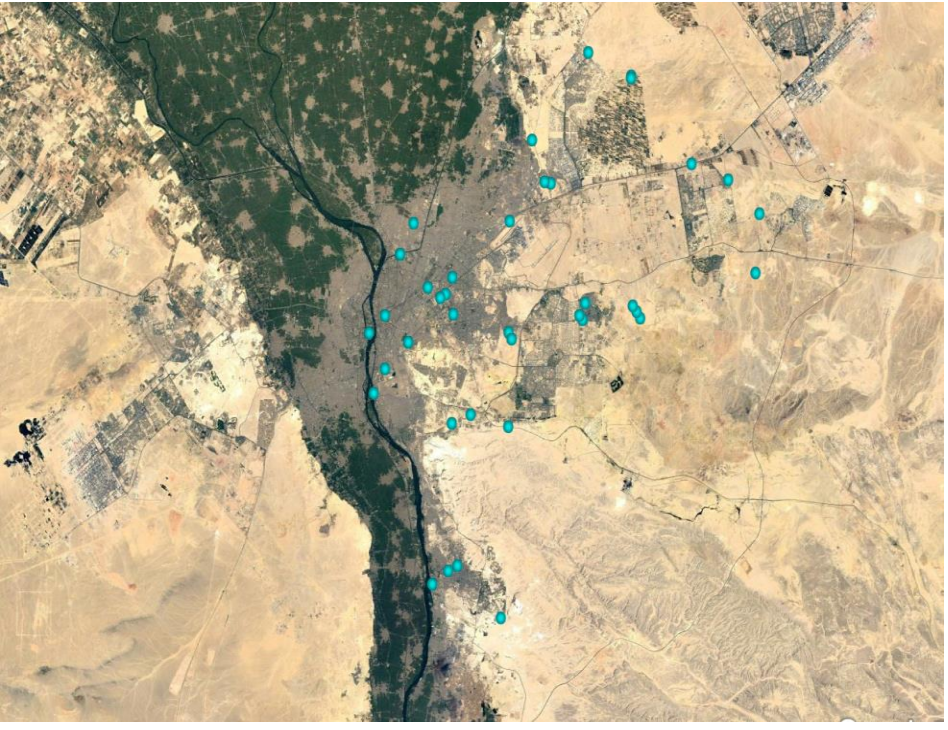


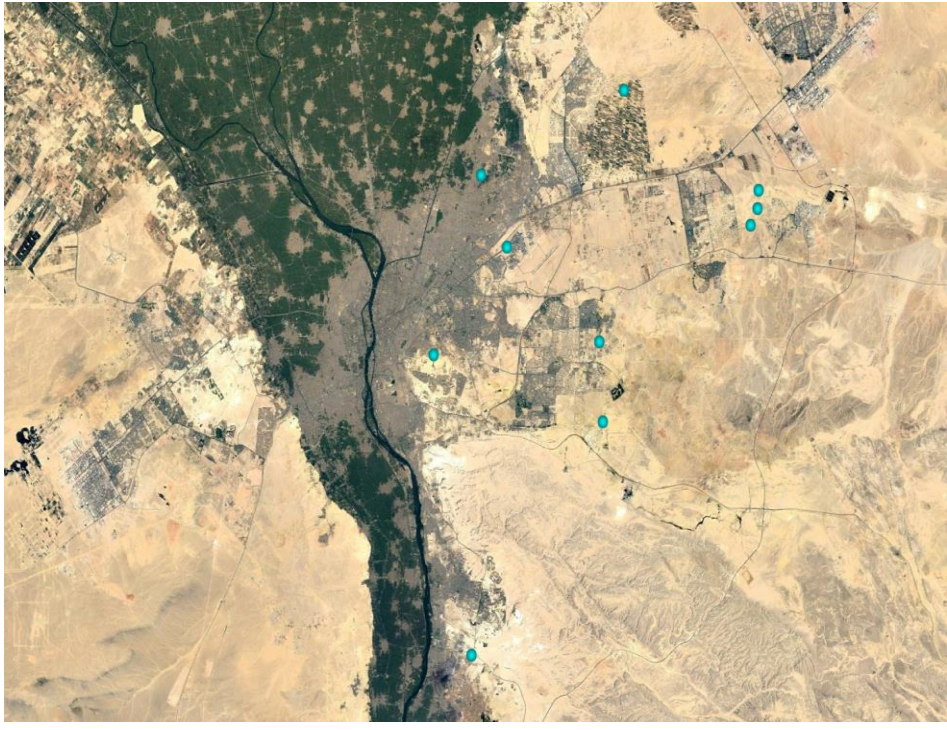
2G Quality
3G Quality
core network
Mobility Issue
No Service
Other
RAN Issue

All Operators: Dropped Calls Locations 1/2

vodafone

orange

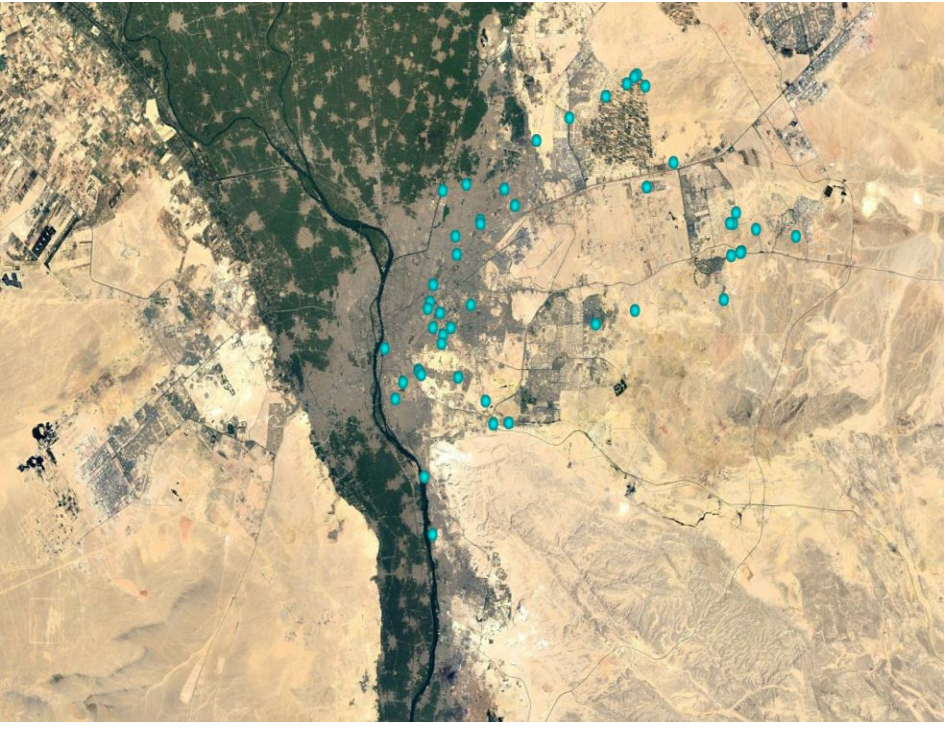


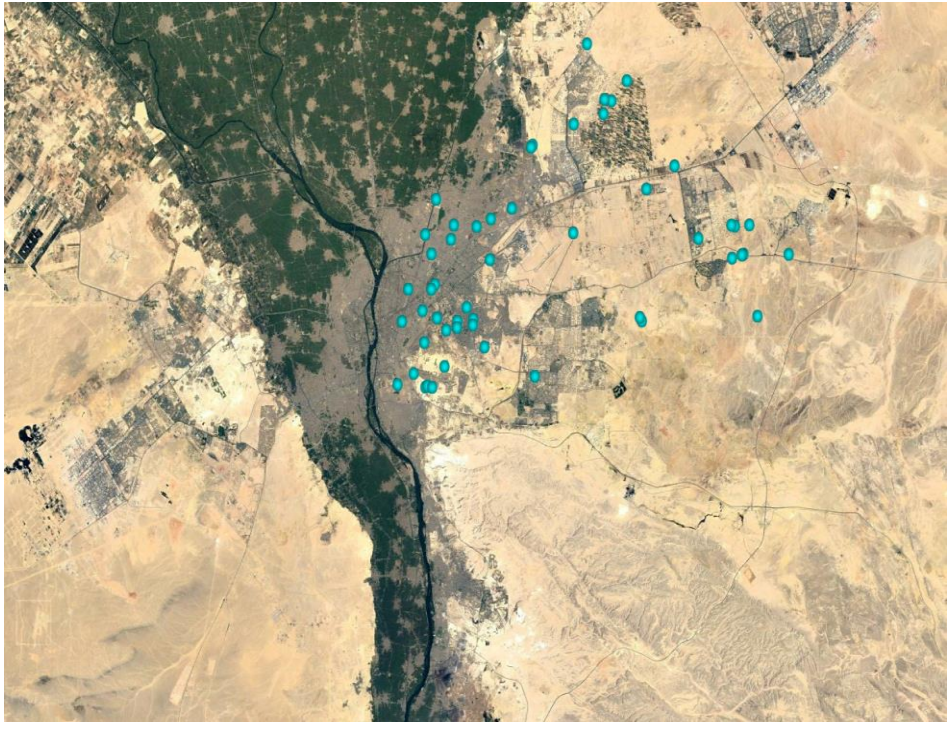


All Operators: Dropped Calls Locations 2/2

etisalat

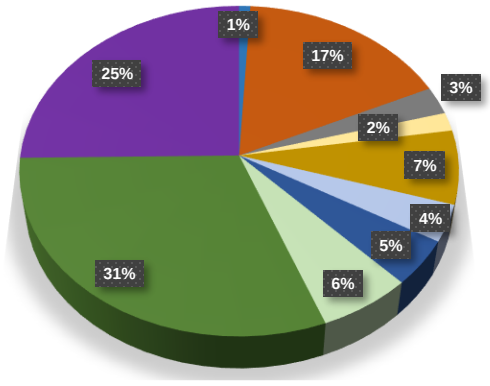
we





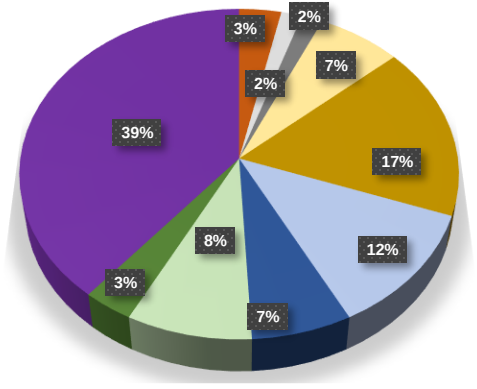
Analysis: Failed Calls Causes

vodafone



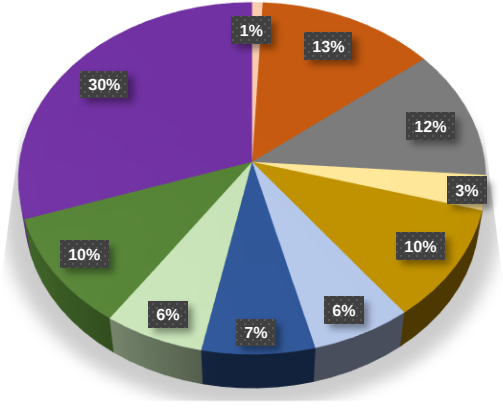
- 2G Quality
- 3G Quality
- 4G Quality
- core network
- CSFB Issue
- Mobility Issue
- No Service
- Other
- paging Issue
- RAN Issue

orange



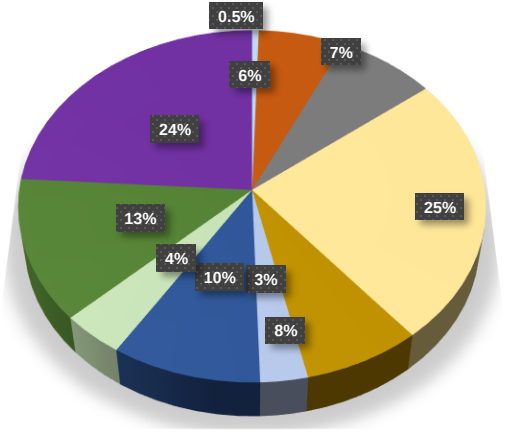
- 3G Quality
- 4G Coverage
- 4G Quality
- core network
- CSFB Issue
- Mobility Issue
- No Service
- Other
- paging Issue
- RAN Issue

etisalat



- 3G Coverage
- 3G Quality
- 4G Quality
- core network
- CSFB Issue
- Mobility Issue
- No Service
- Other
- paging Issue
- RAN Issue

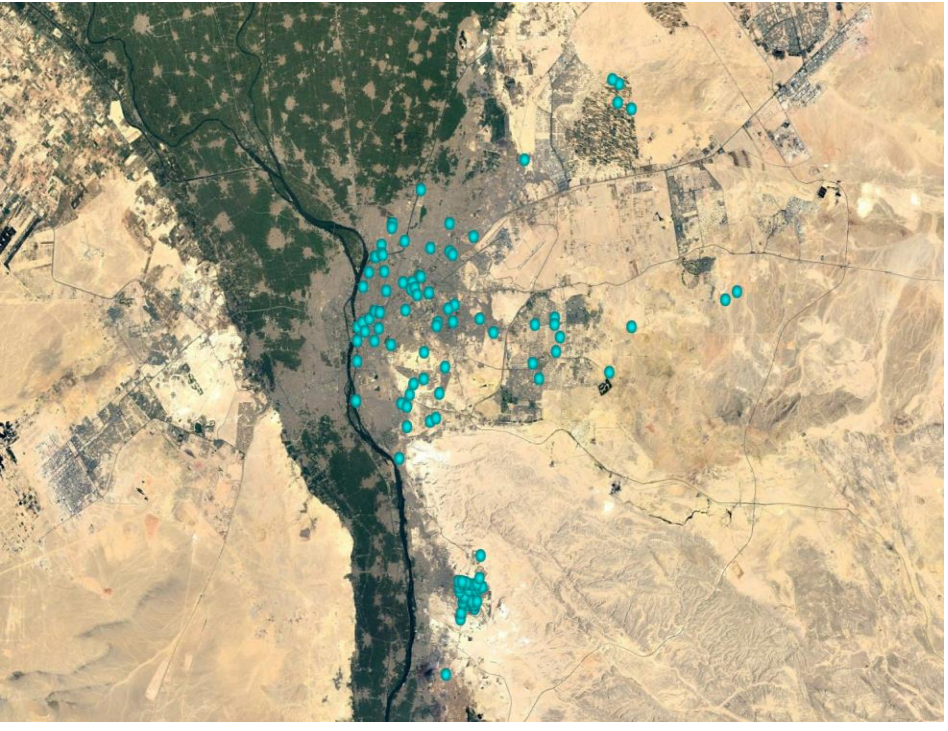
we



- 2G Coverage
- 3G Quality
- 4G Quality
- core network
- CSFB Issue
- Mobility Issue
- No Service
- Other
- paging Issue
- RAN Issue

All Operators: Blocked Calls Locations 1/2

vodafone



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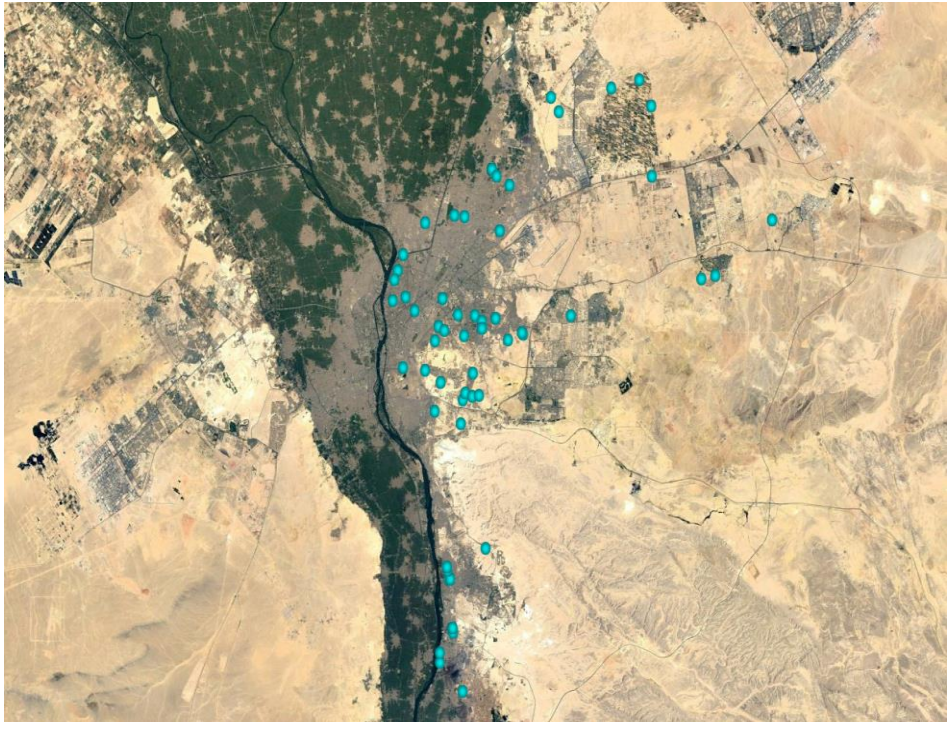
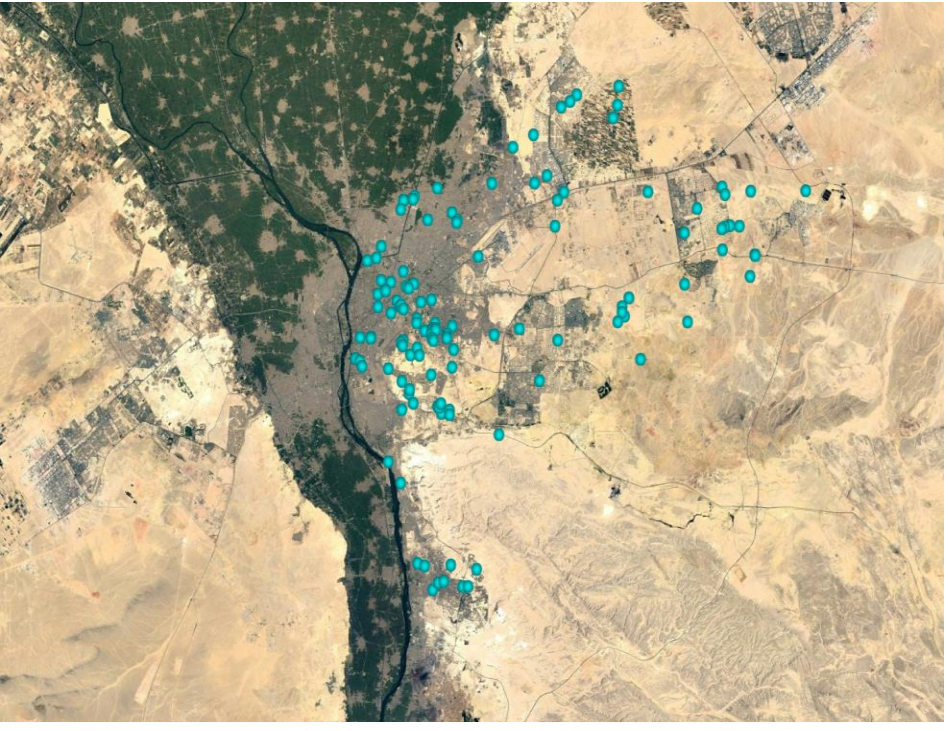


All Operators: Blocked Calls Locations 2/2

etisalat



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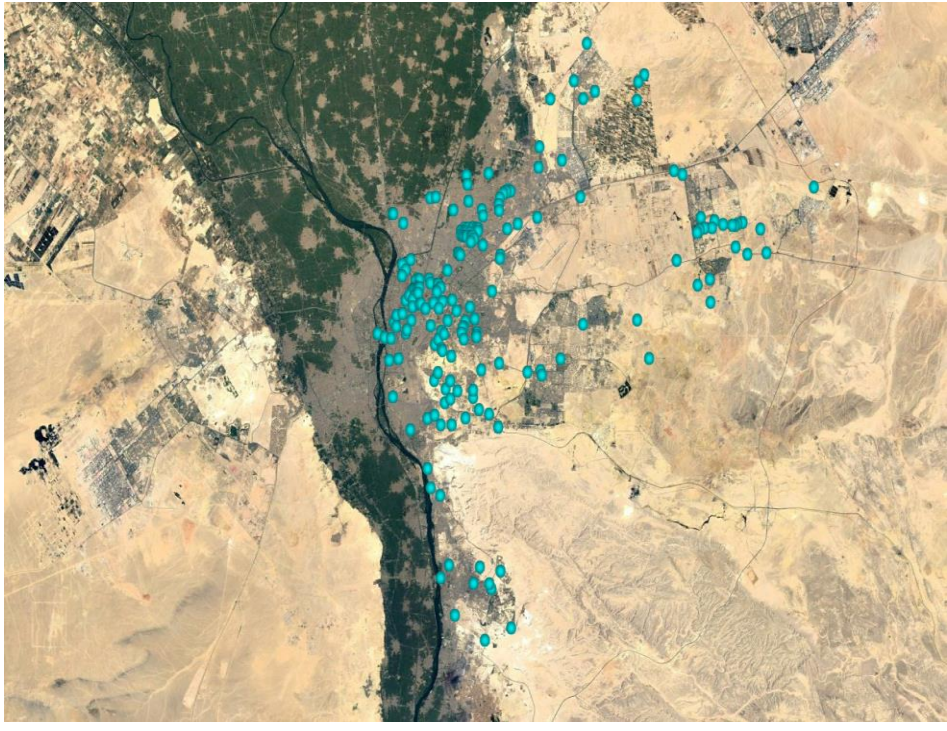
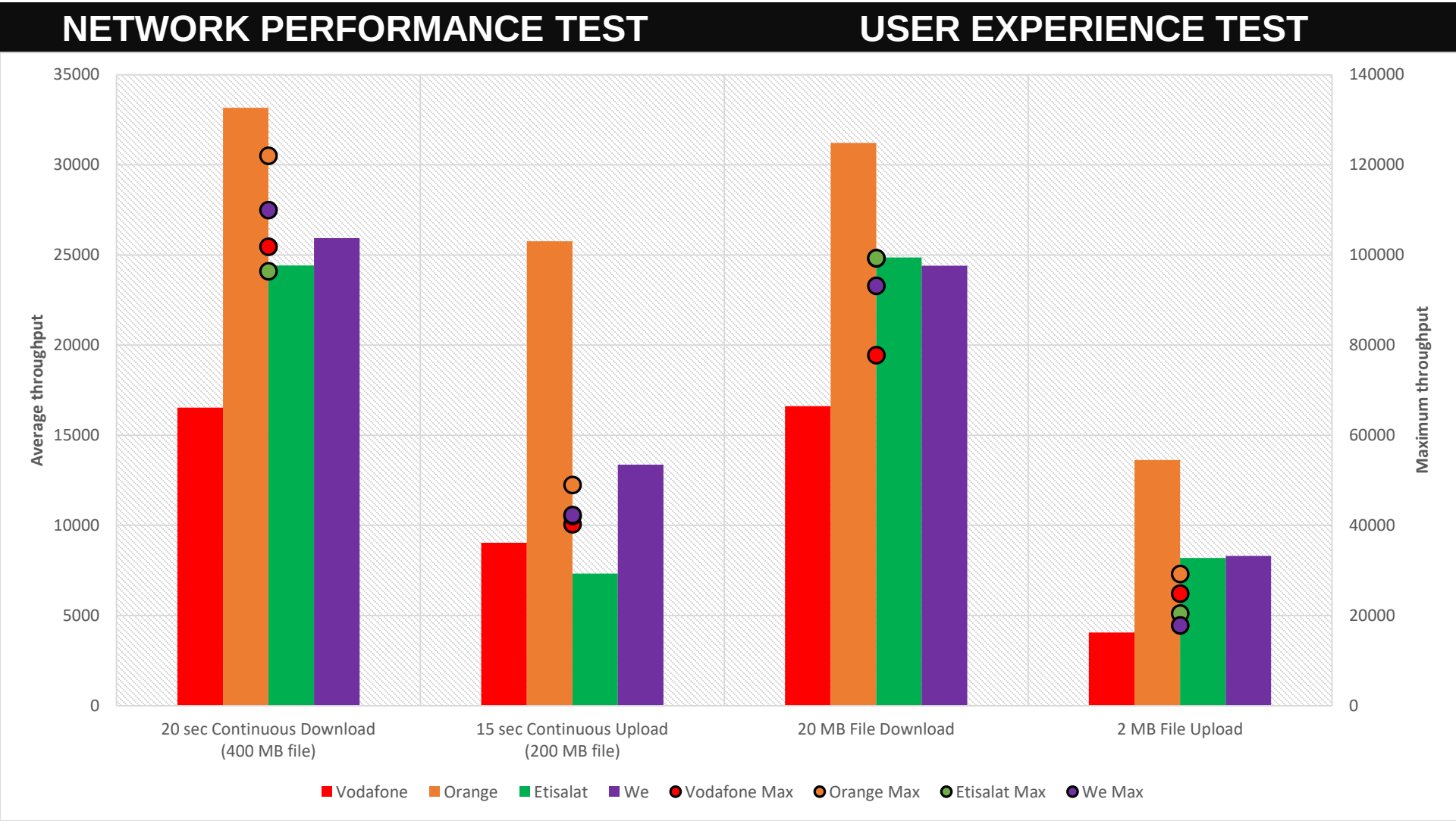


Agenda

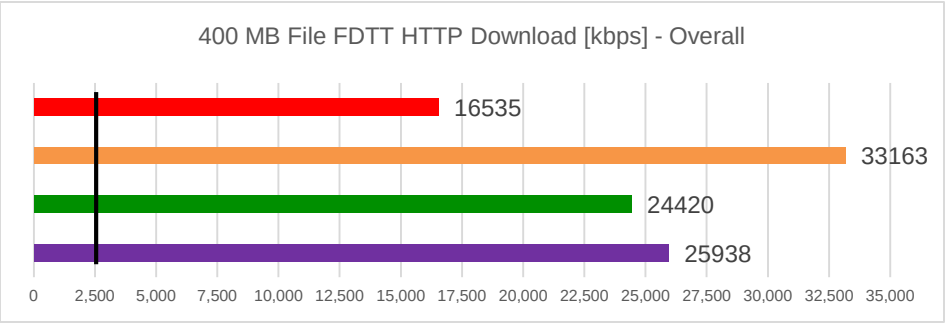
1. *Quantitative Information*
2. *Voice Service Quality & Performance – Cairo*
3. ***Data Service Quality & Performance – Cairo***
4. *Voice Service Quality & Performance - Giza*
5. *Data Service Quality & Performance – Giza*
6. *Voice Service Quality & Performance - Alexandria*
7. *Data Service Quality & Performance - Alexandria*
8. *Voice Service Quality & Performance - Delta*
9. *Data Service Quality & Performance – Delta*
10. *Voice Service Quality & Performance – Upper Egypt*
11. *Data Service Quality & Performance – Upper Egypt*
12. *Annexes*

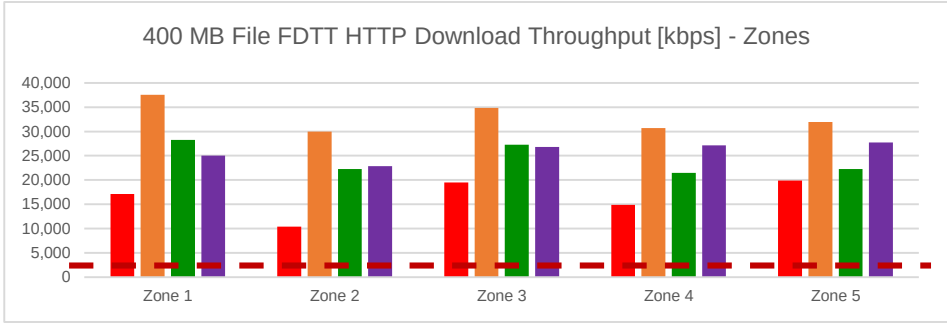
Data Service KPI’s

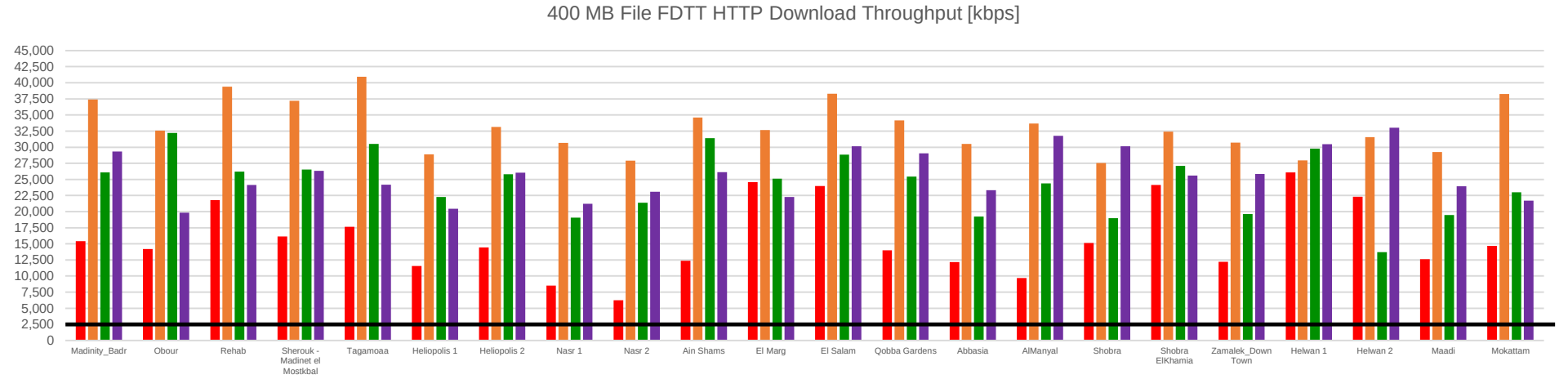
Free Mode Throughput Per Test Type



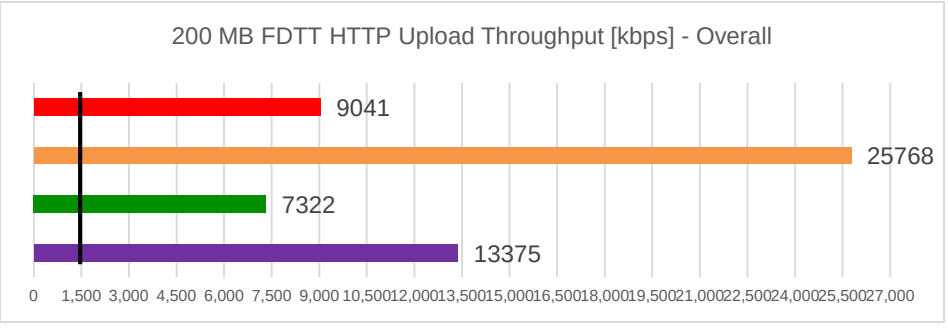
FDTT HTTP Download Transfer Throughput – Network Performance

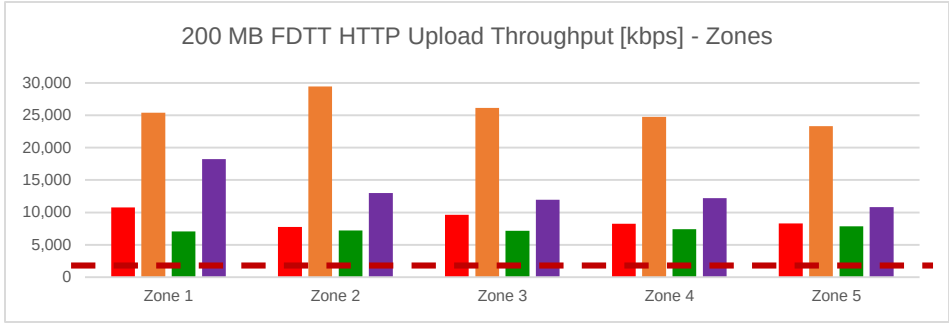


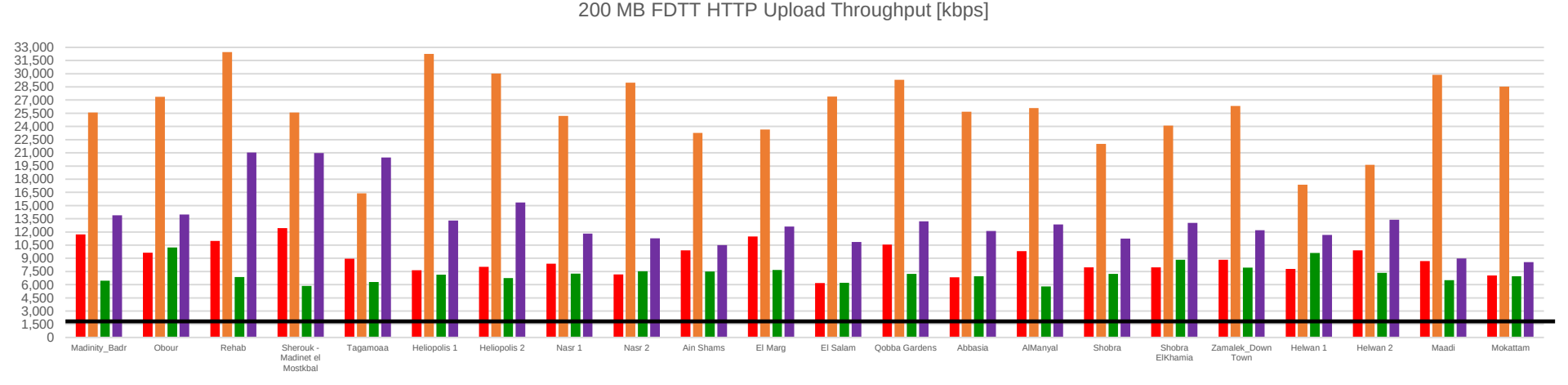




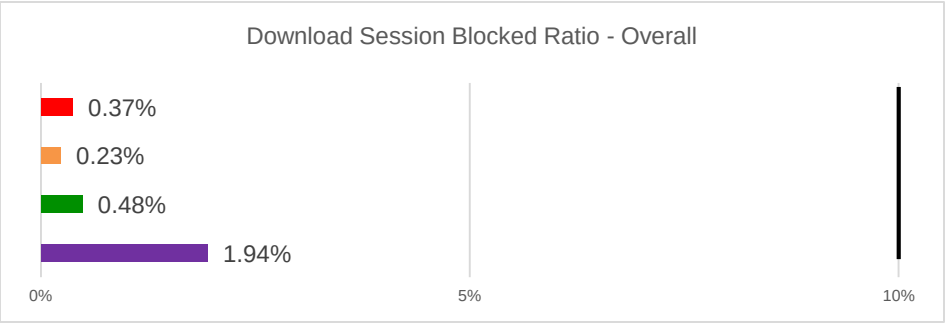
FDTT HTTP Upload Transfer Throughput – Network Performance

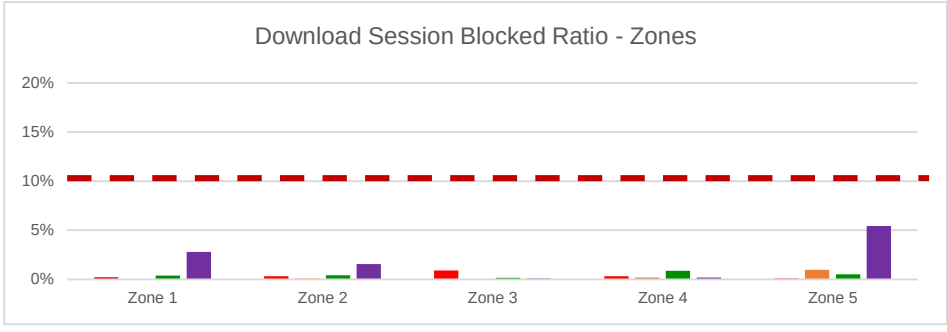


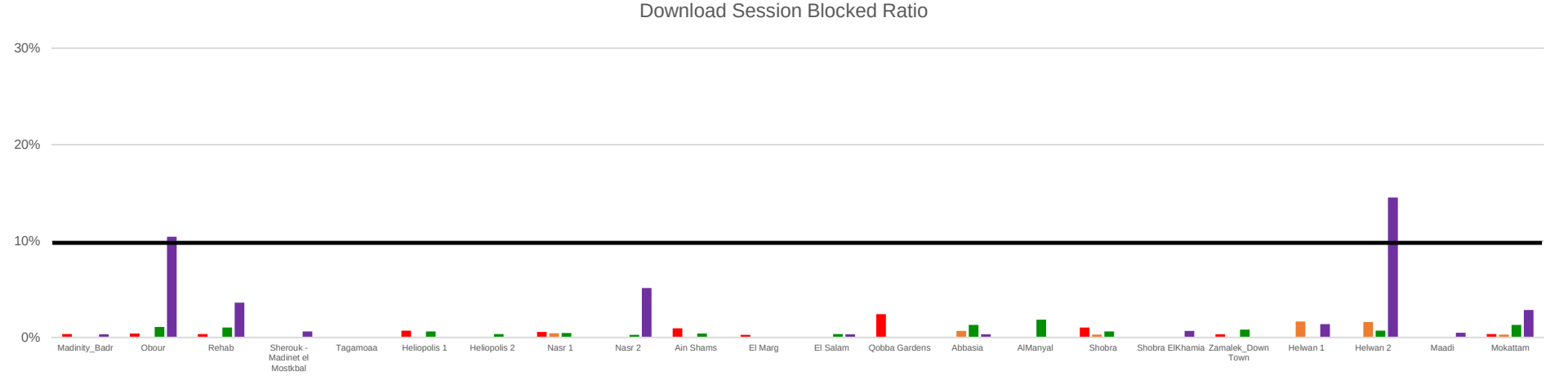




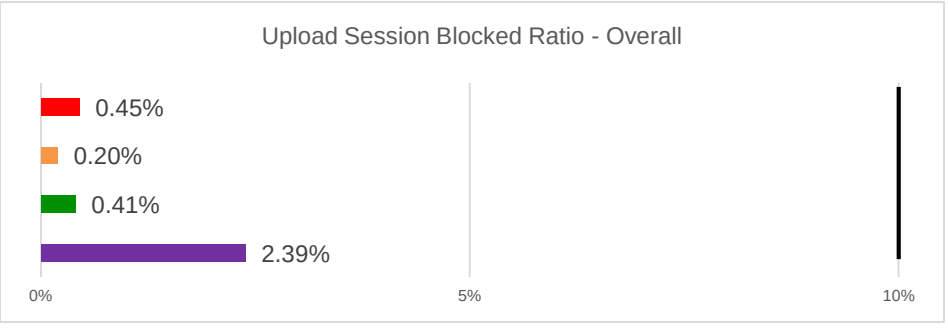
HTTP Download Session Blocked Rates

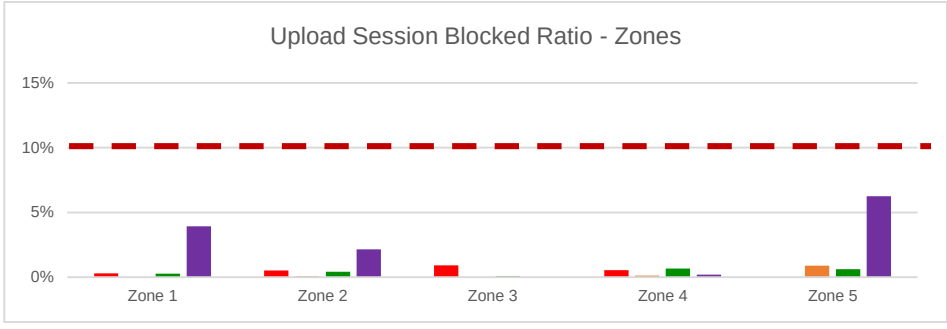


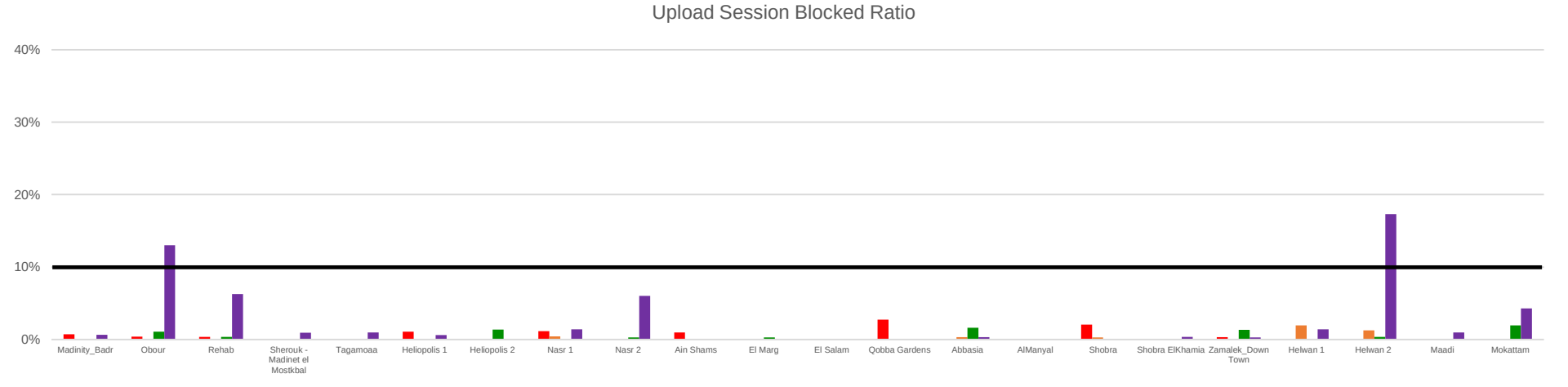




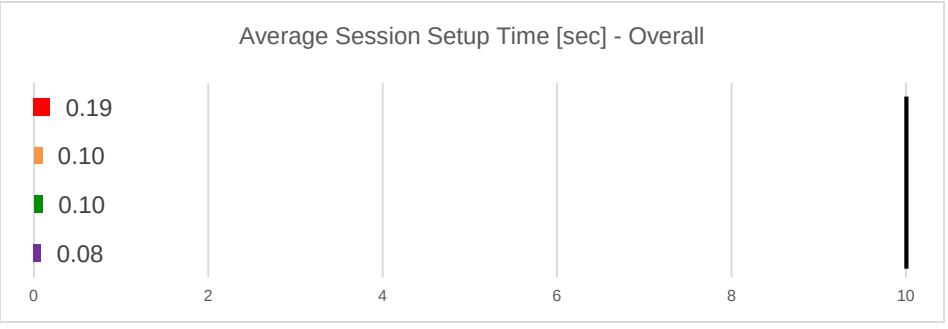
HTTP Upload Session Blocked Rates

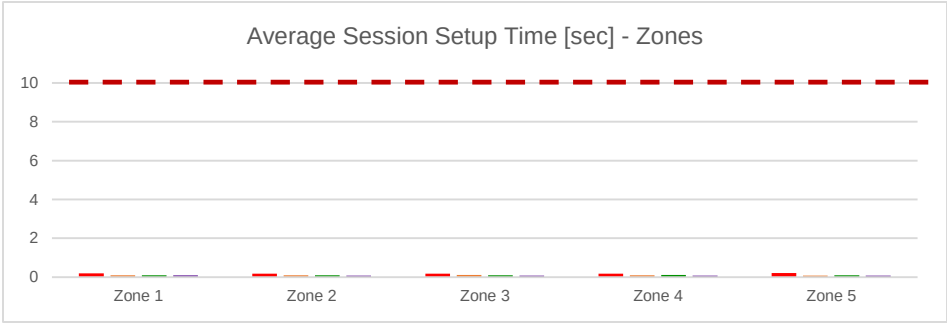


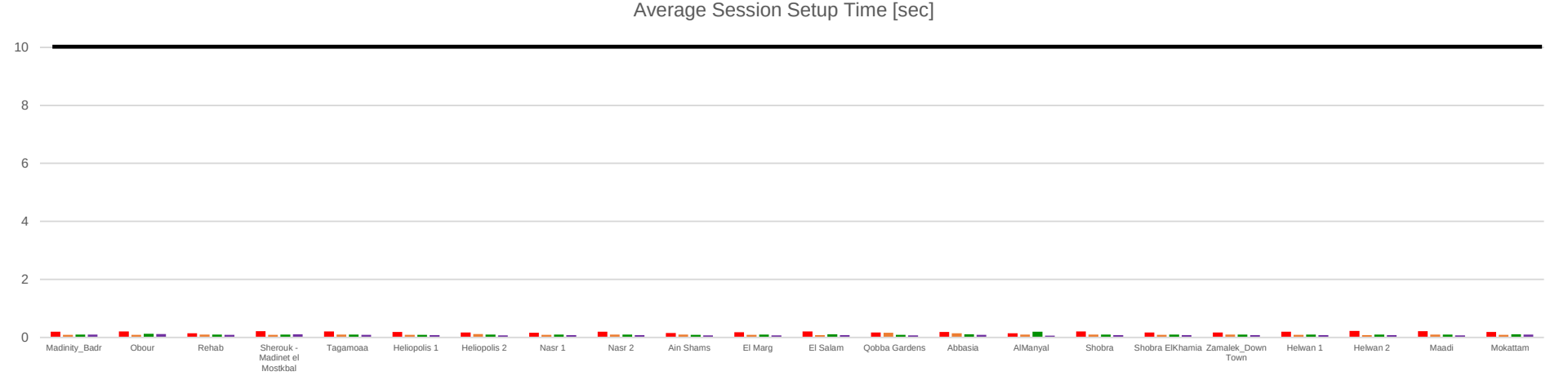




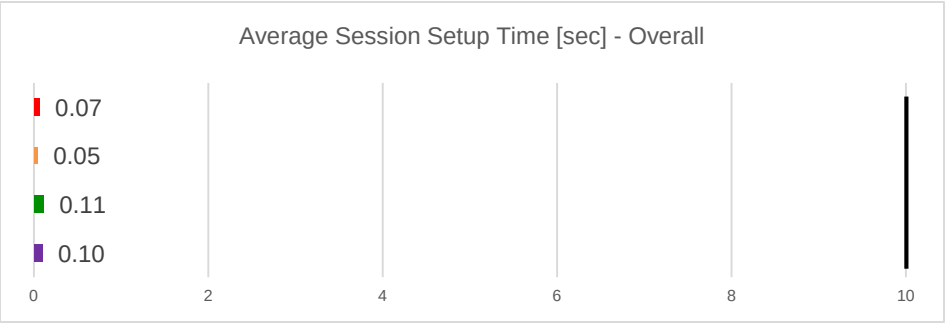
HTTP Download Average Session Setup Time

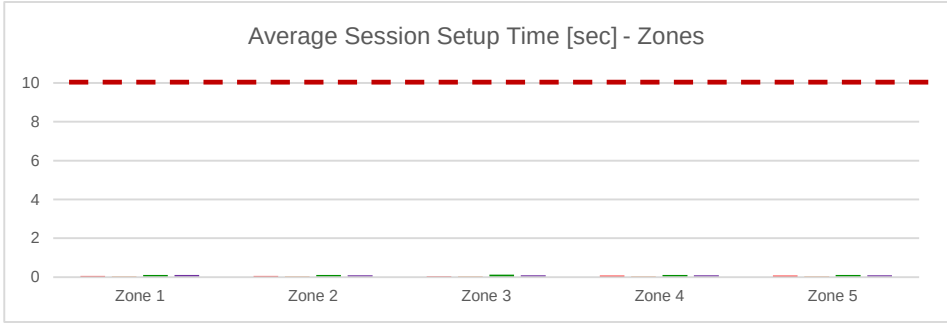


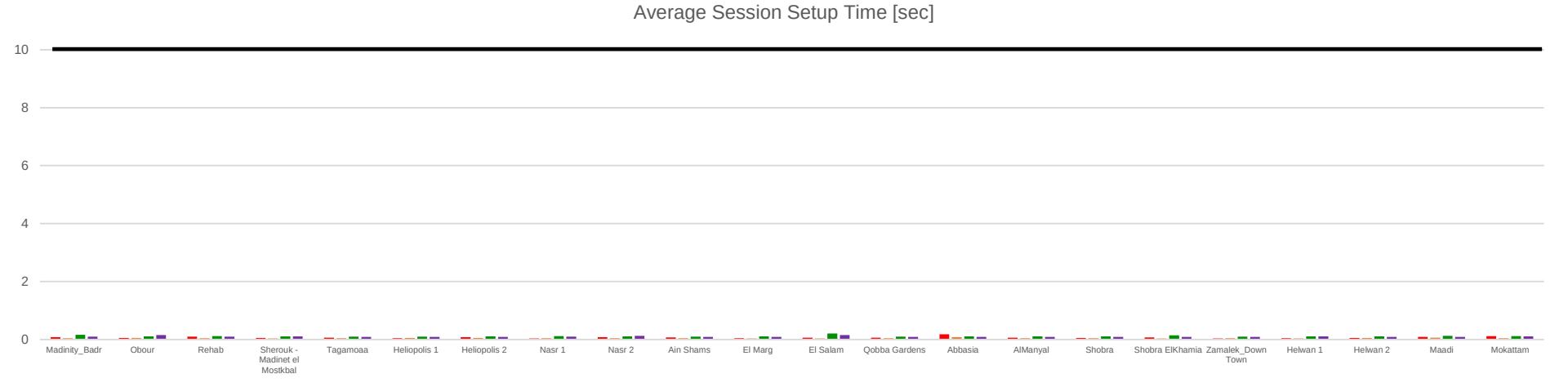




HTTP Upload Average Session Setup Time

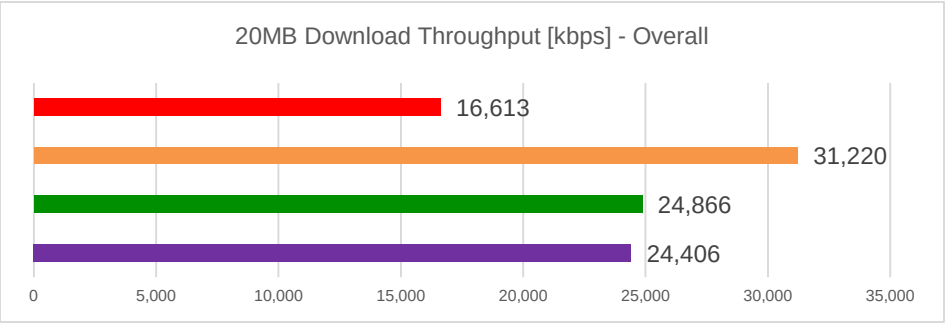


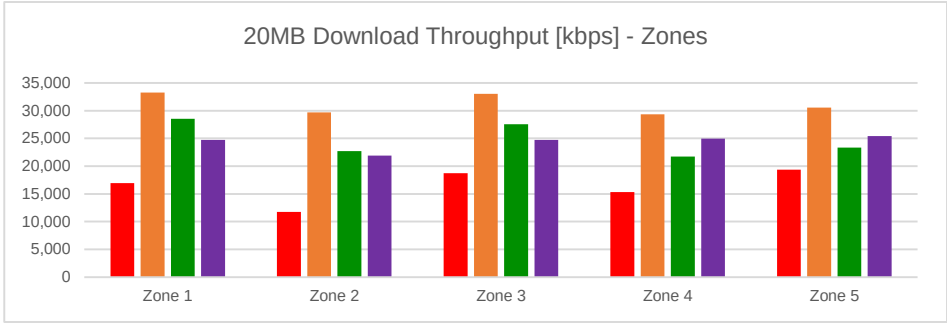


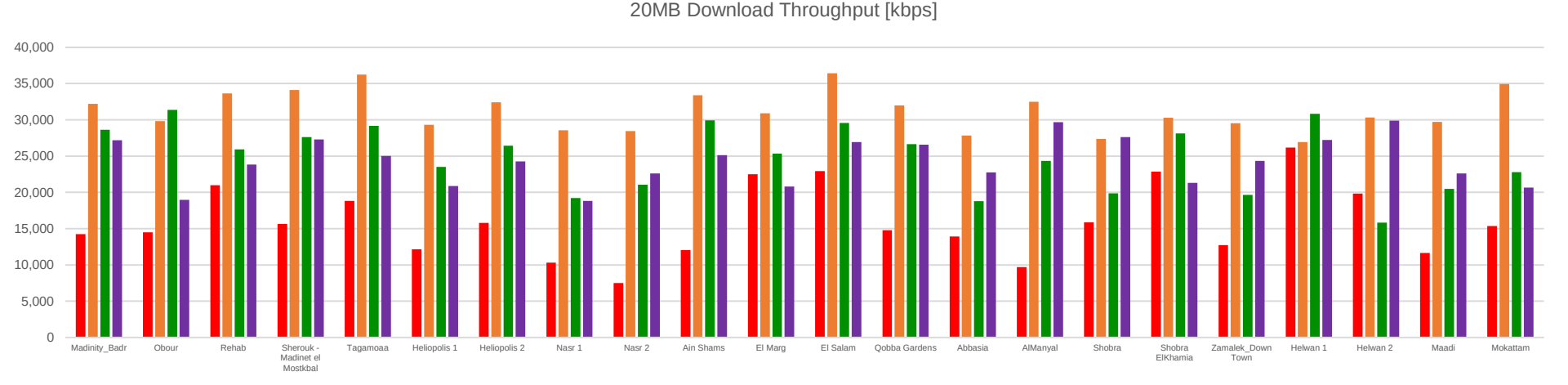


Throughput KPI’s – Customer Experience

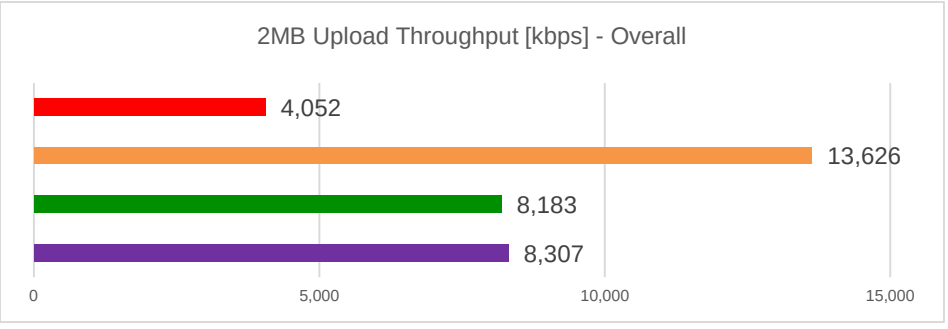
HTTP Download Throughput – Customer Experience

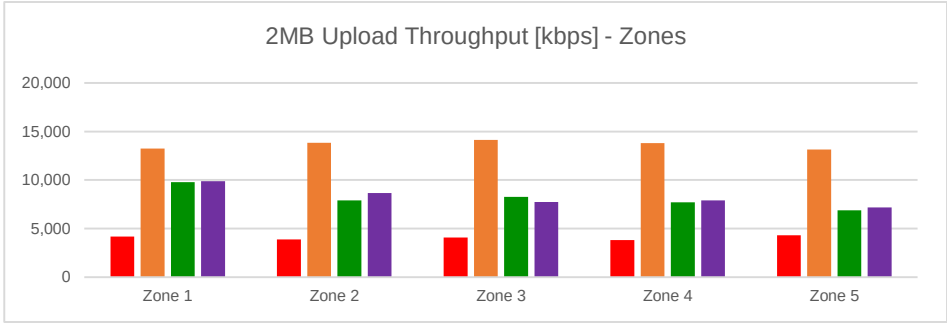


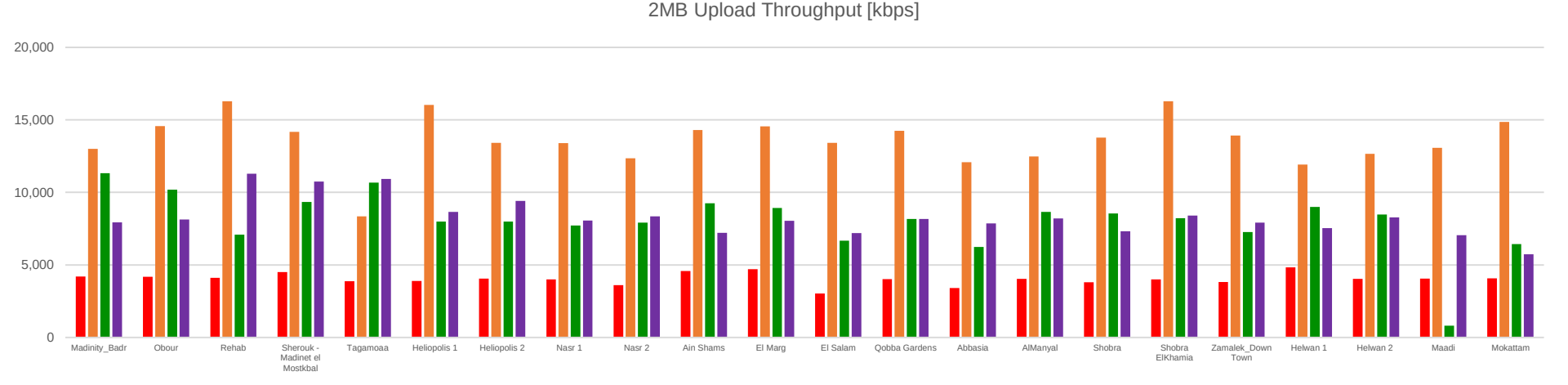


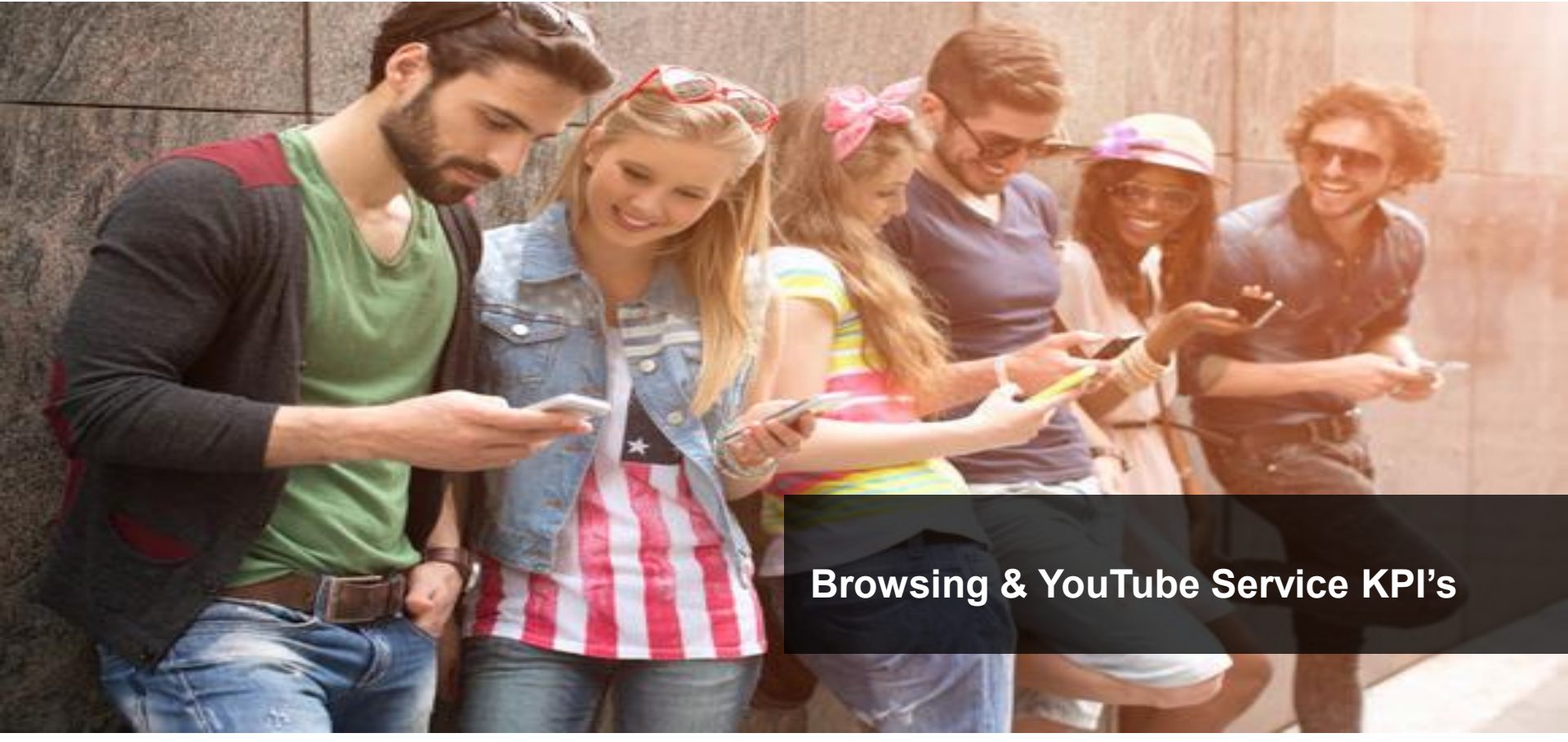


HTTP Upload Throughput – Customer Experience



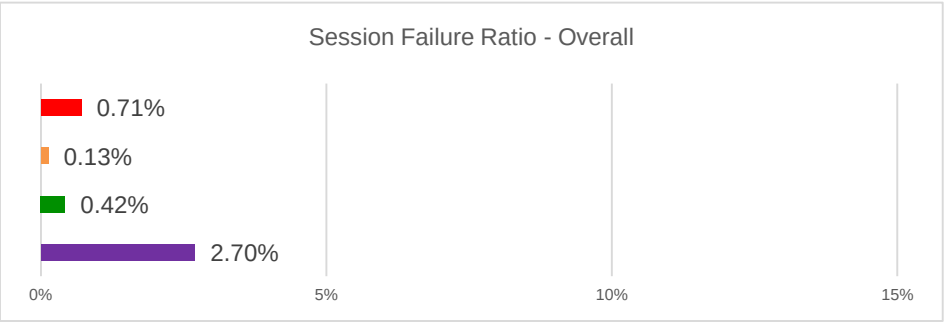


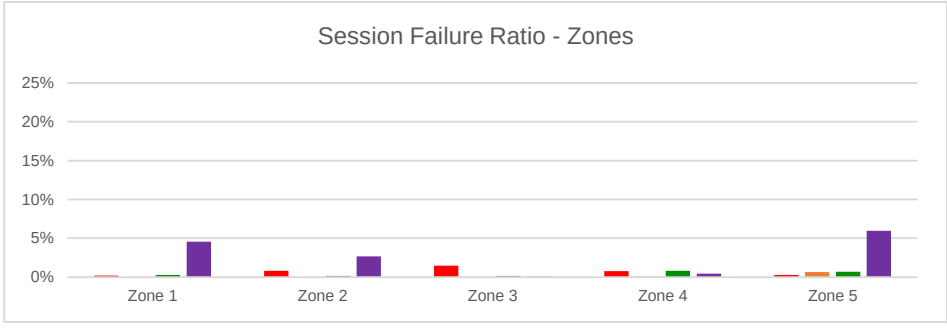


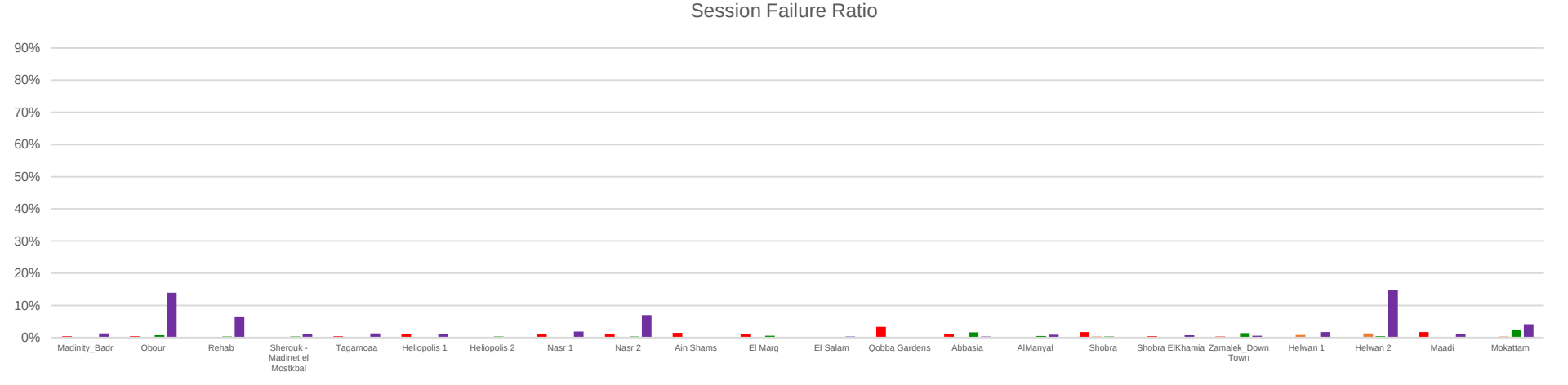


Browsing & YouTube Service KPI’s

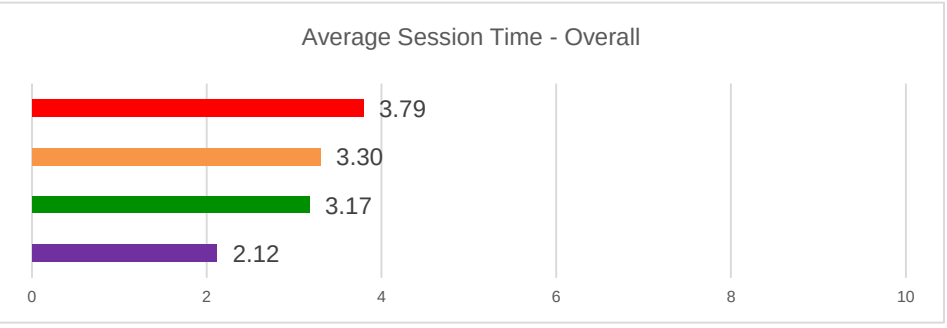
Session Failure Ratio

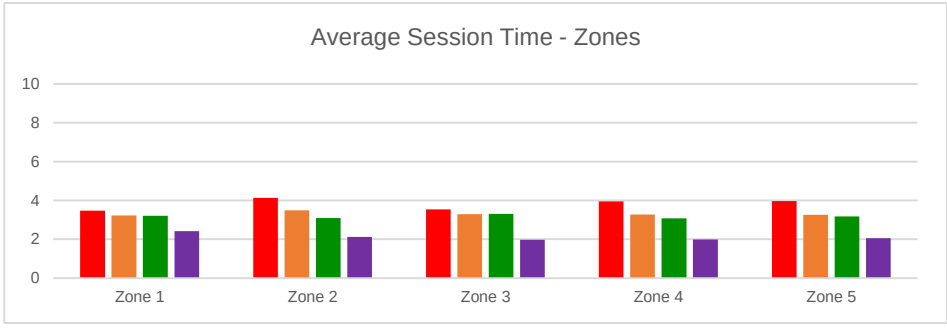


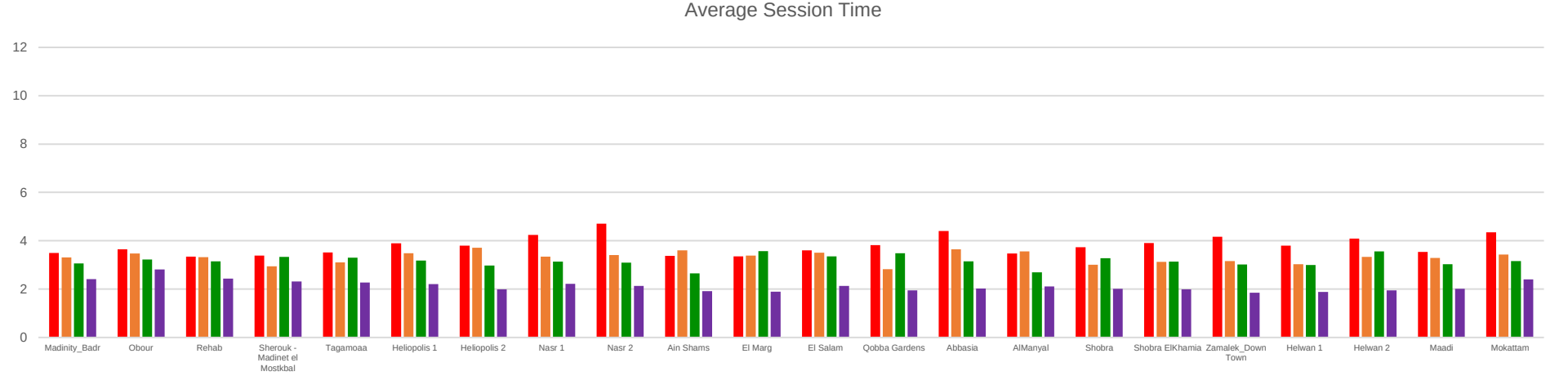




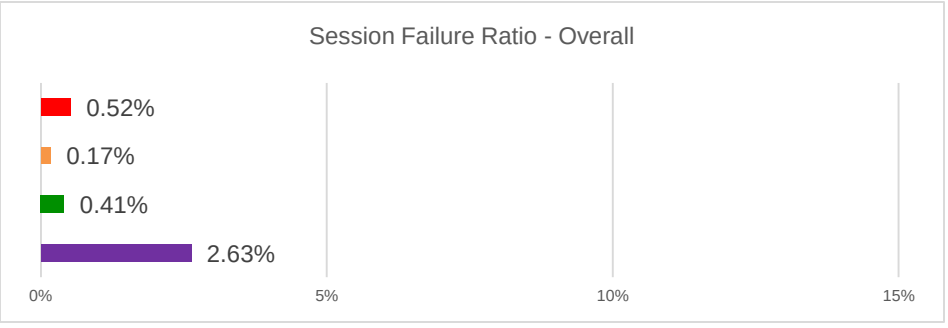
Session Time

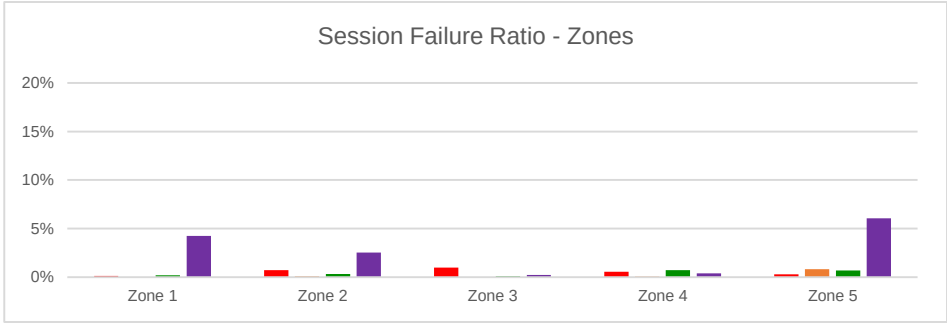


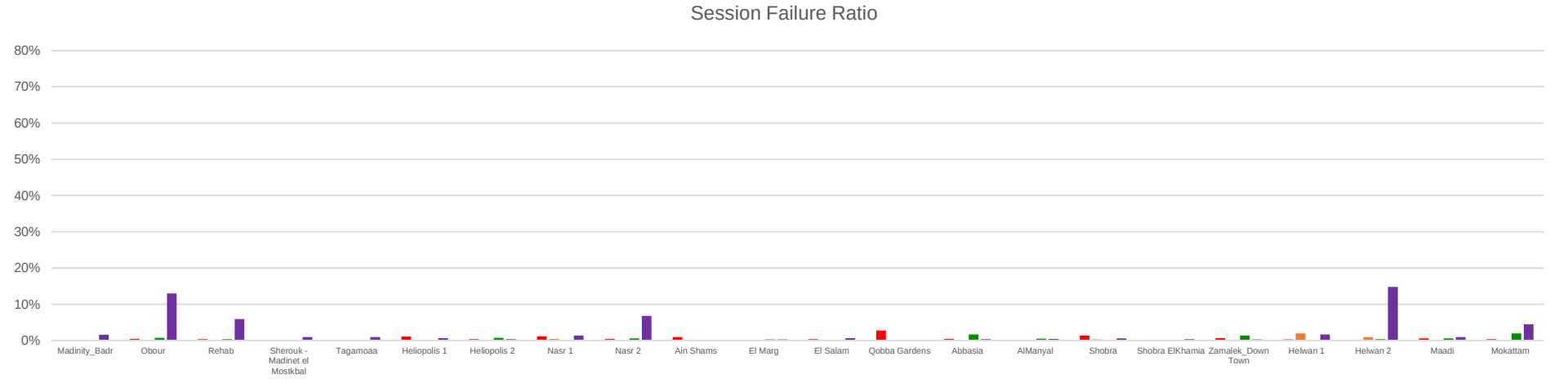




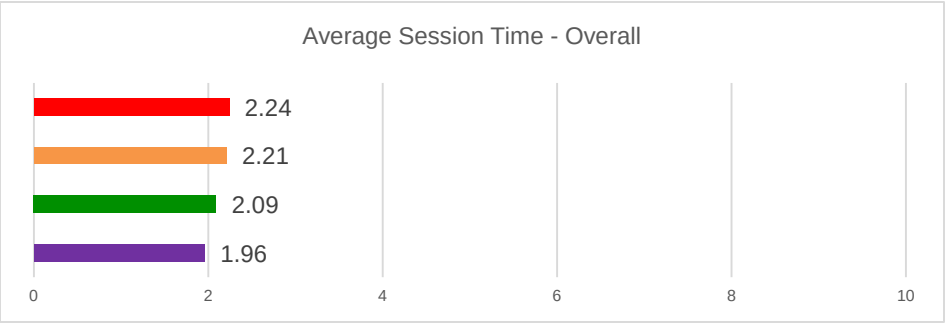
Google Session Failure Ratio

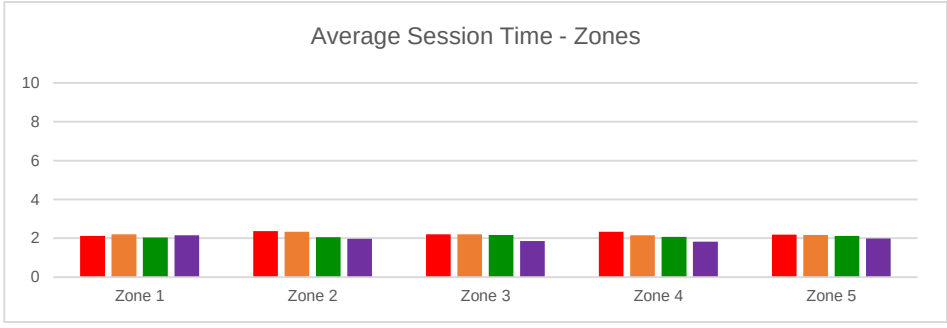


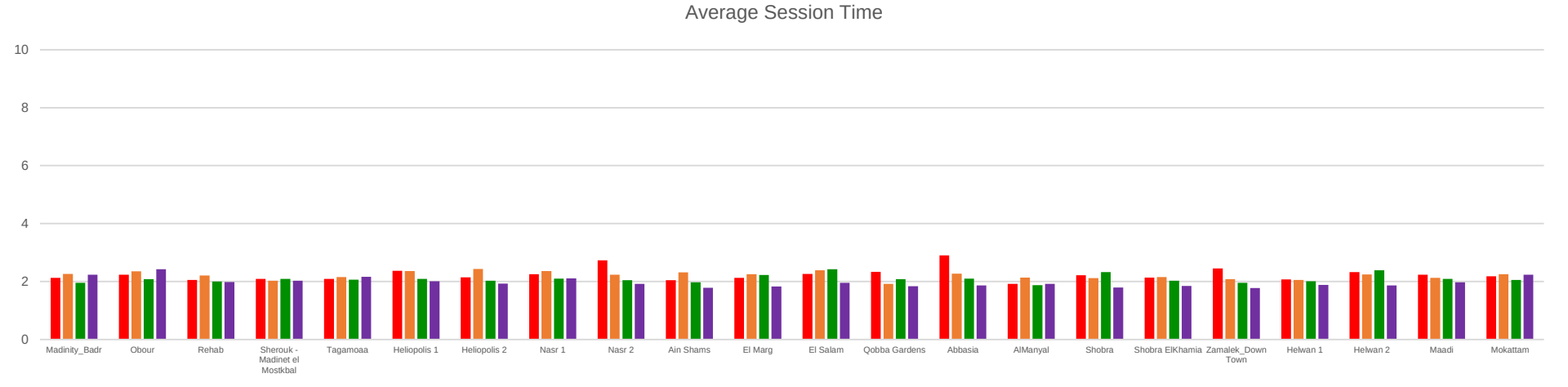




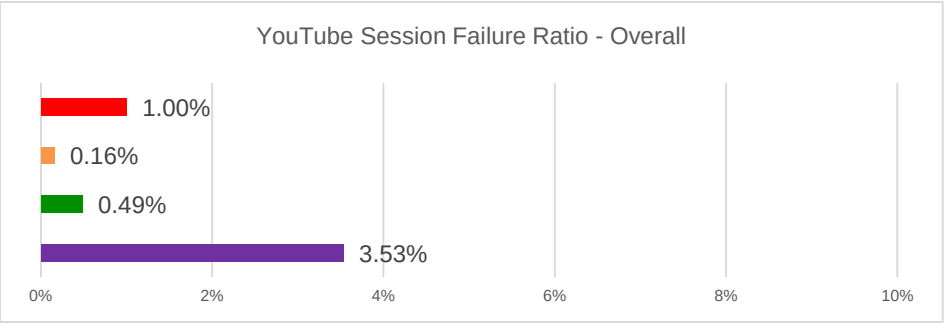
Google Session Time

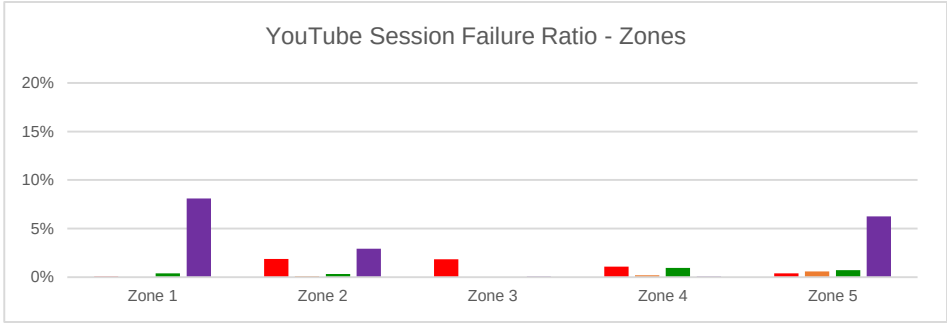


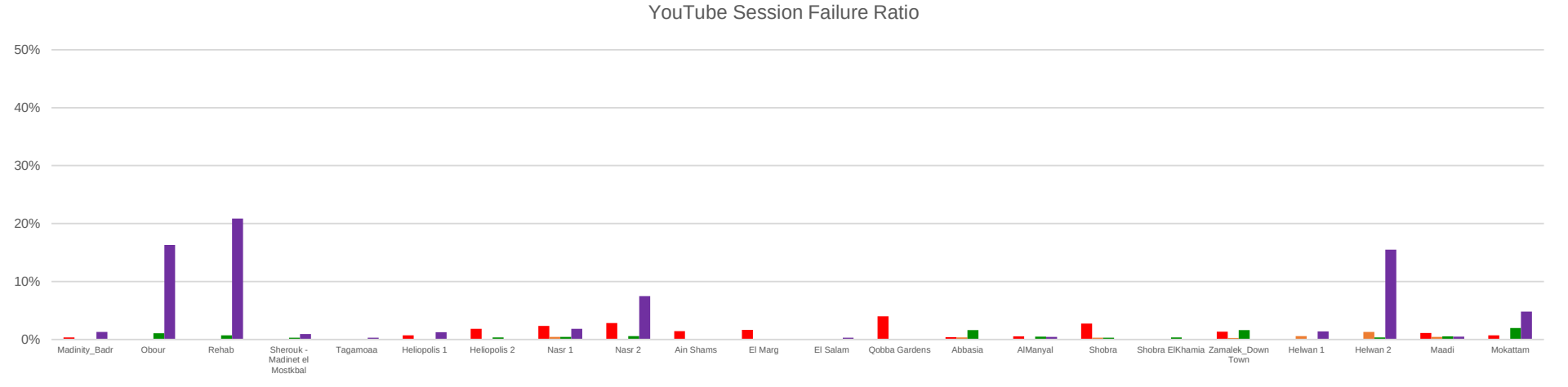




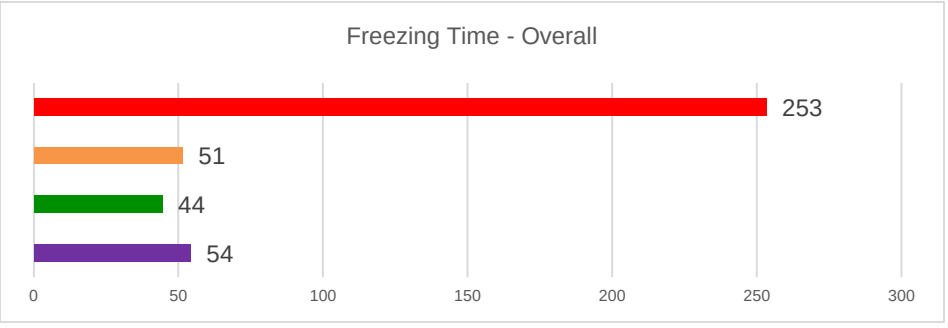
YouTube Session Failure Ratio

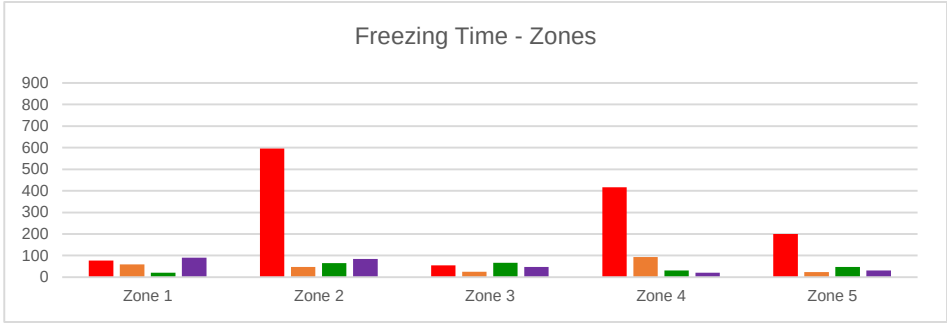


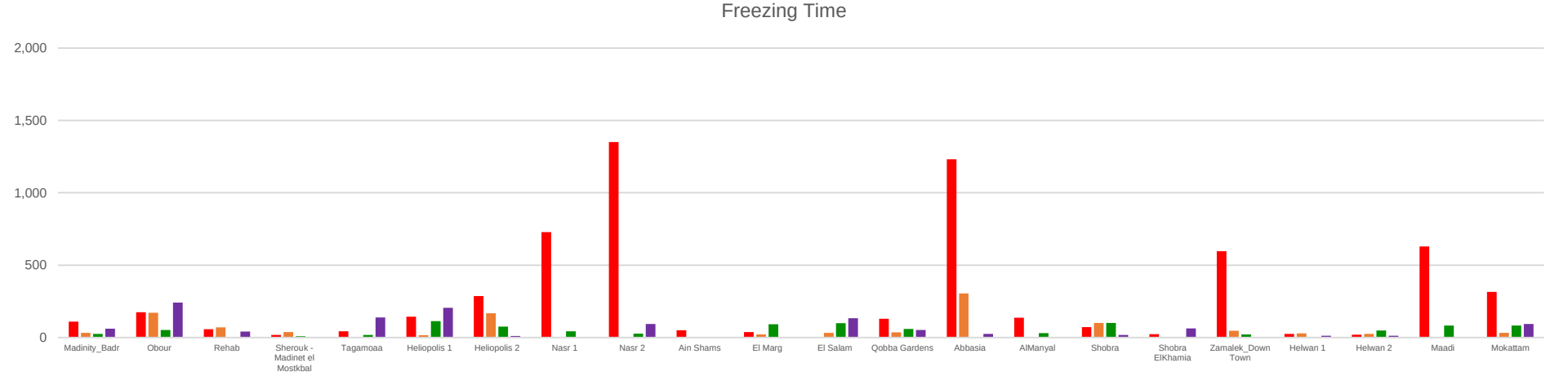




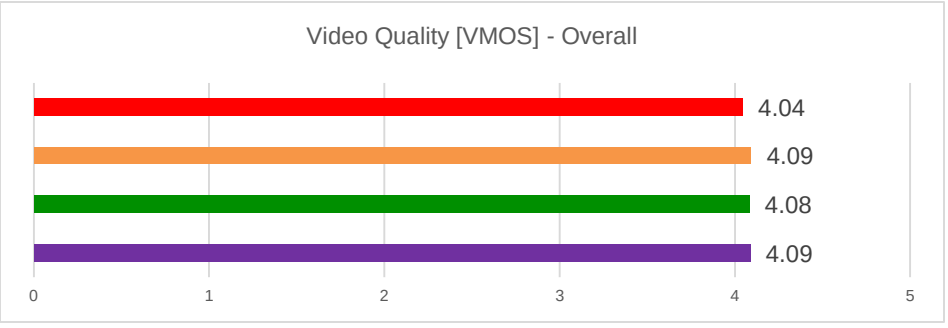
YouTube Freezing Time [msec]

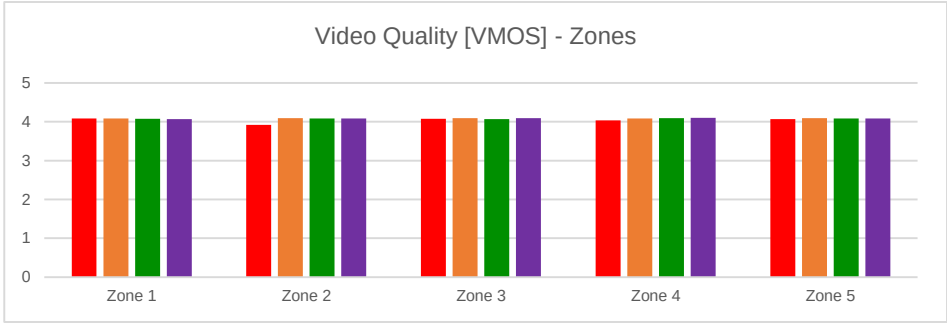


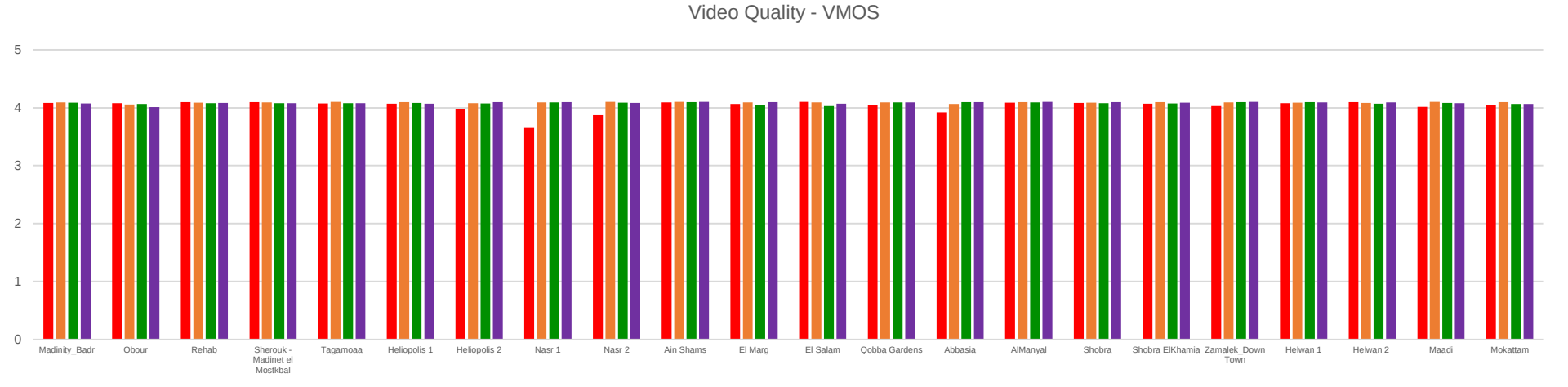




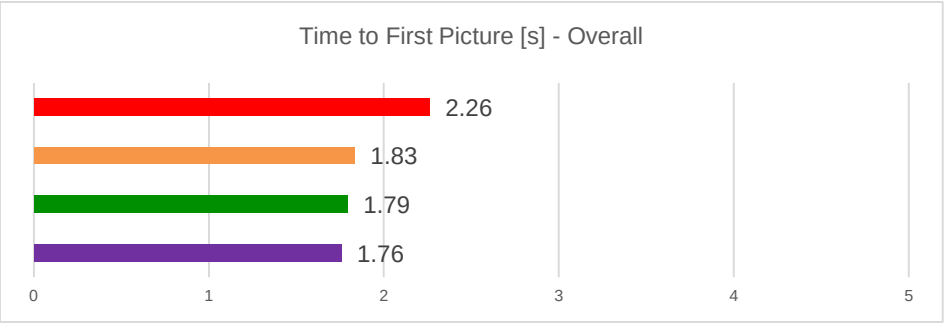
YouTube Video Quality

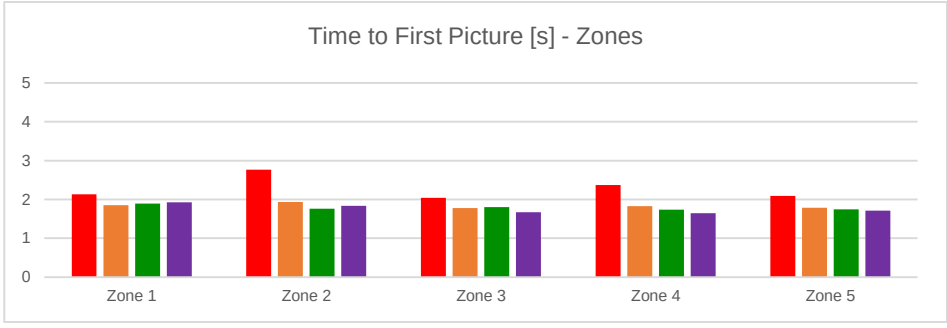


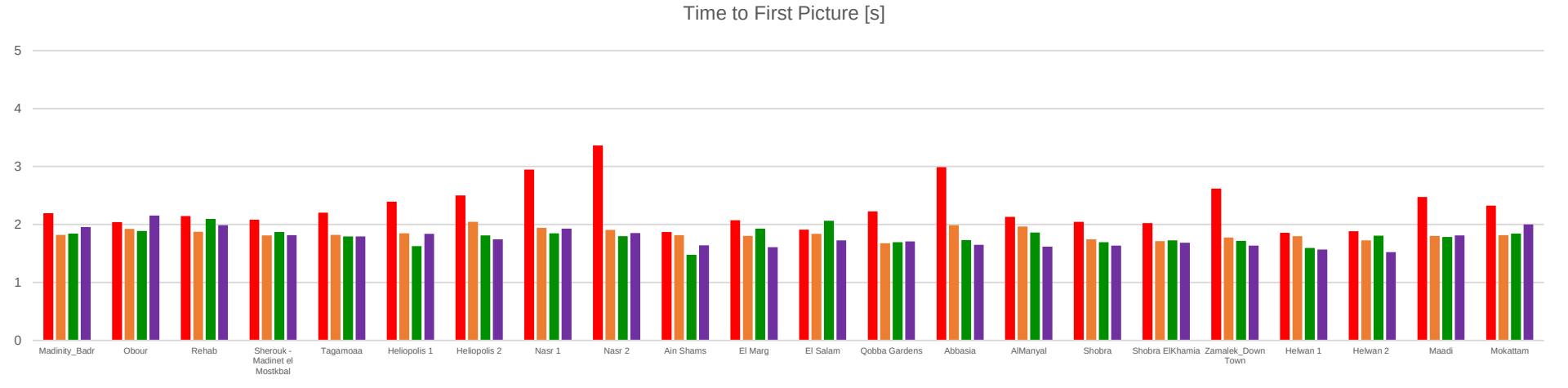




YouTube Time to 1st Picture

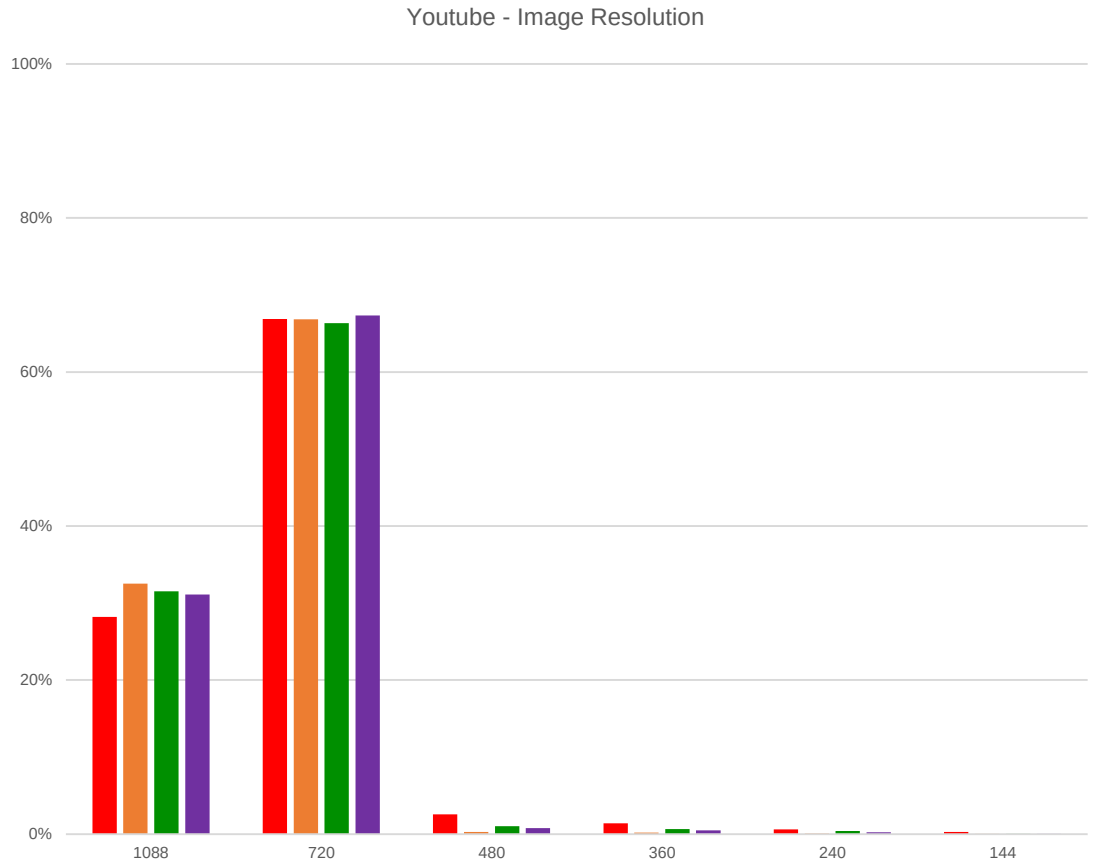






YouTube

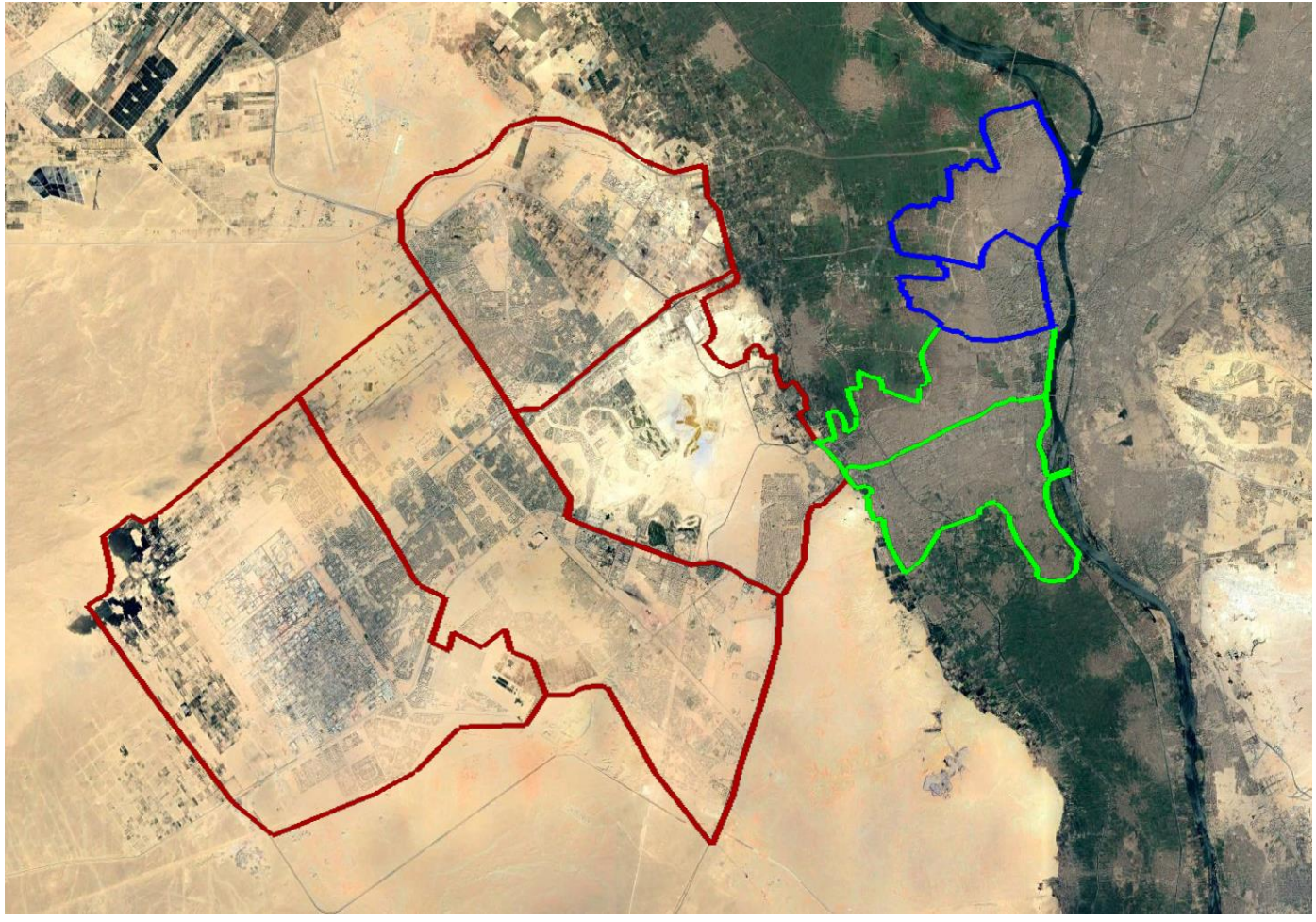
Image Resolution



Agenda

1. *Quantitative Information*
2. *Voice Service Quality & Performance – Cairo*
3. *Data Service Quality & Performance – Cairo*
4. ***Voice Service Quality & Performance - Giza***
5. *Data Service Quality & Performance – Giza*
6. *Voice Service Quality & Performance - Alexandria*
7. *Data Service Quality & Performance - Alexandria*
8. *Voice Service Quality & Performance - Delta*
9. *Data Service Quality & Performance – Delta*
10. *Voice Service Quality & Performance – Upper Egypt*
11. *Data Service Quality & Performance – Upper Egypt*
12. *Annexes*

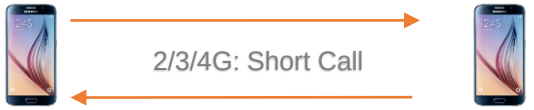
Zones Definition

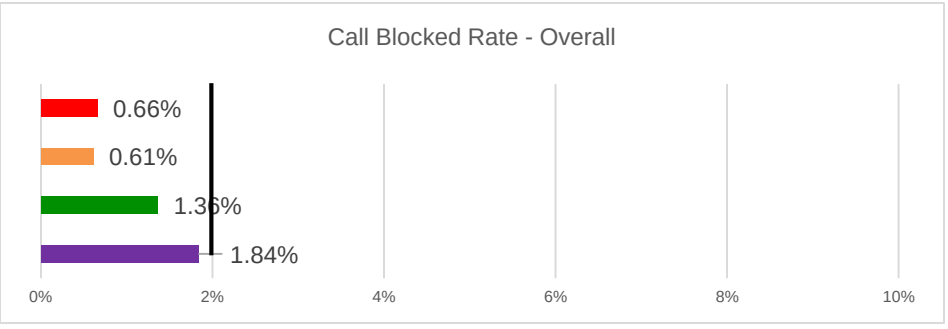


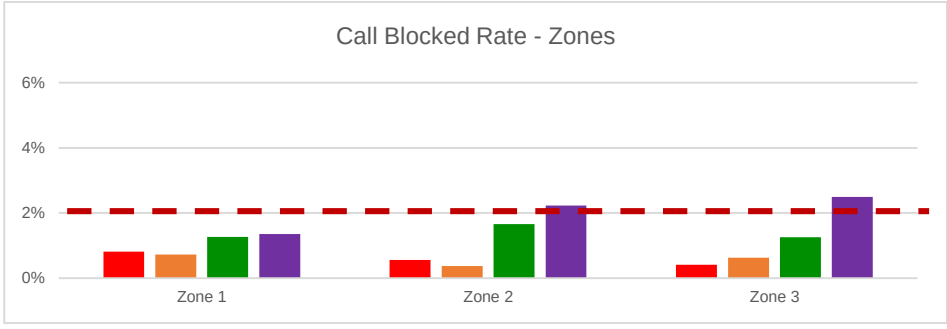
Giza	
Giza Z1	Zayed 1 Zayed 2 6th of Oct 1 6th of Oct 2
Giza Z2	Faisal Haram
Giza Z3	Embaba Mohandseen

Voice Service KPI’s

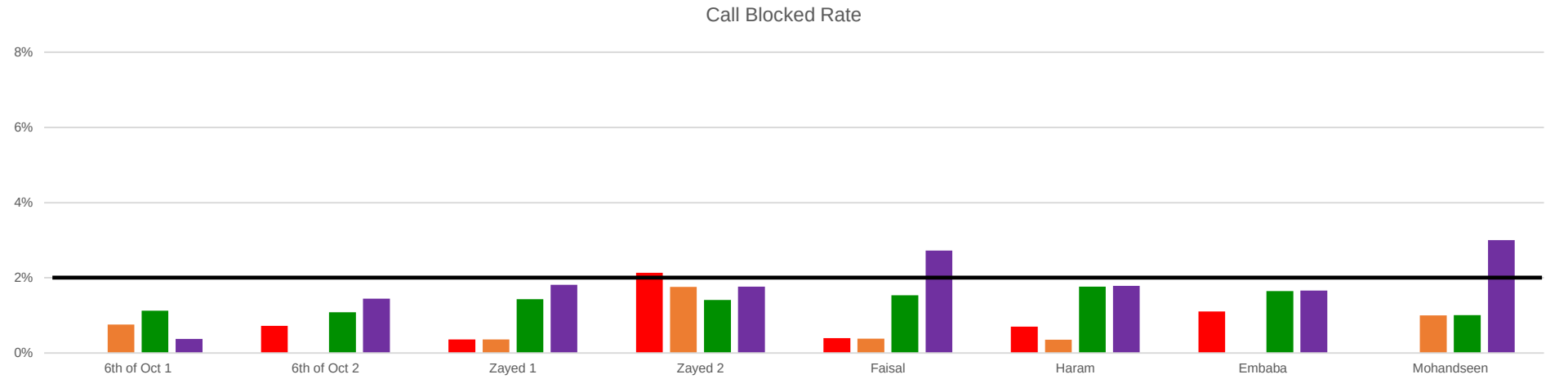
Accessibility: Call Blocked Rate



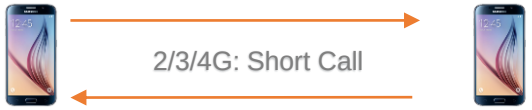


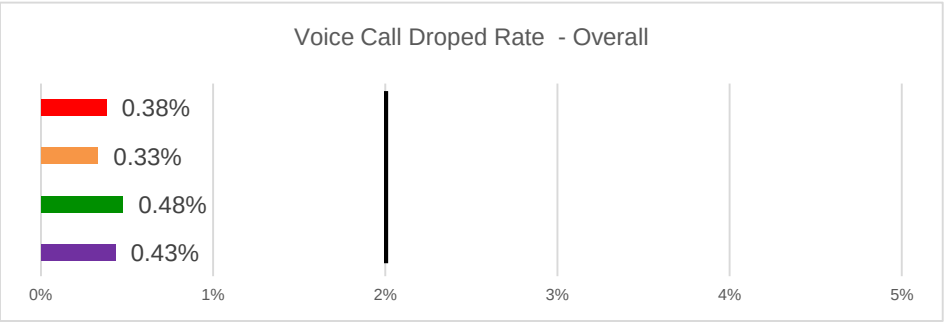


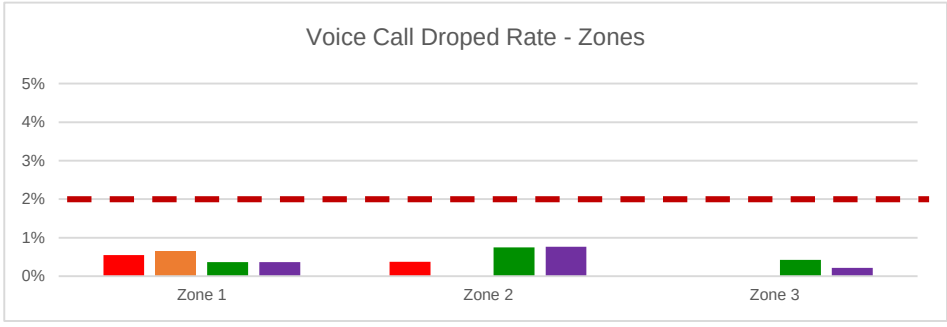
Call Blocked Rate *represents the ratio between unsuccessful call attempts and all calls made (both successful & unsuccessful).*



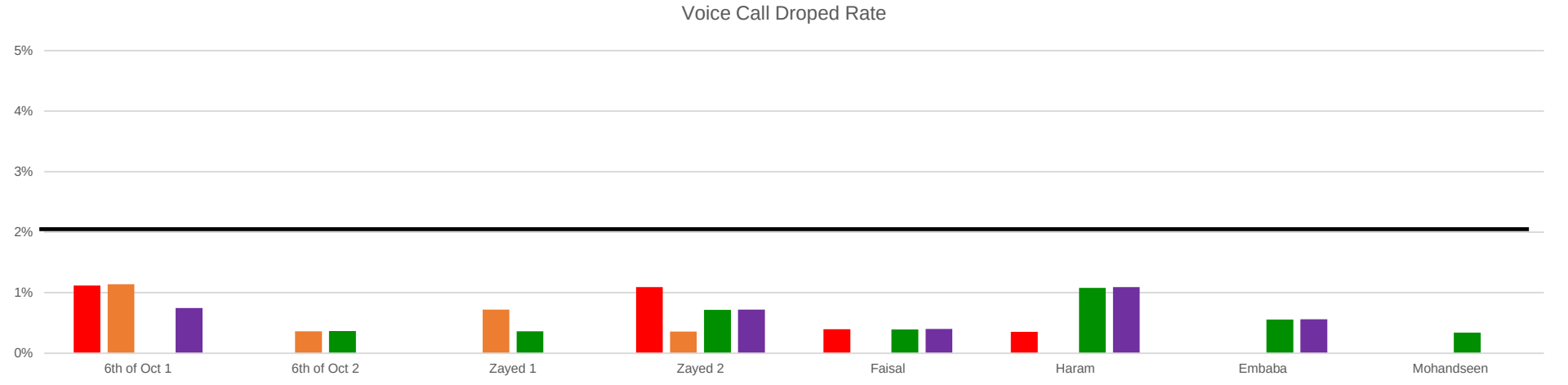
Retainability: Call Dropped Rate



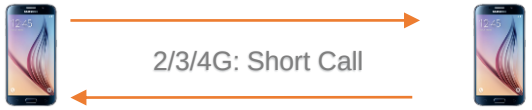


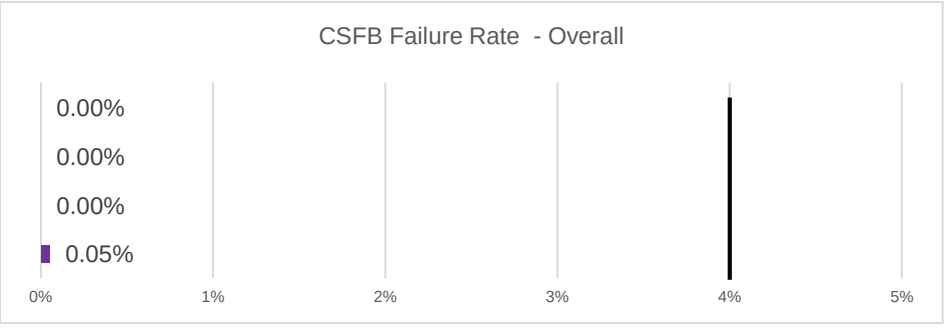


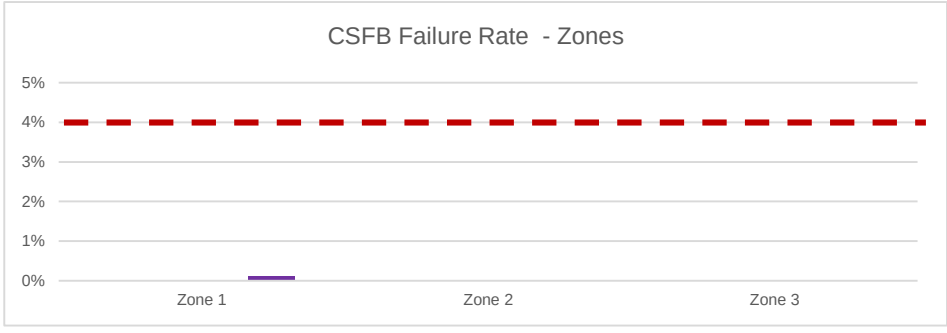
Voice Call Retainability *is represented by call drop rates.*



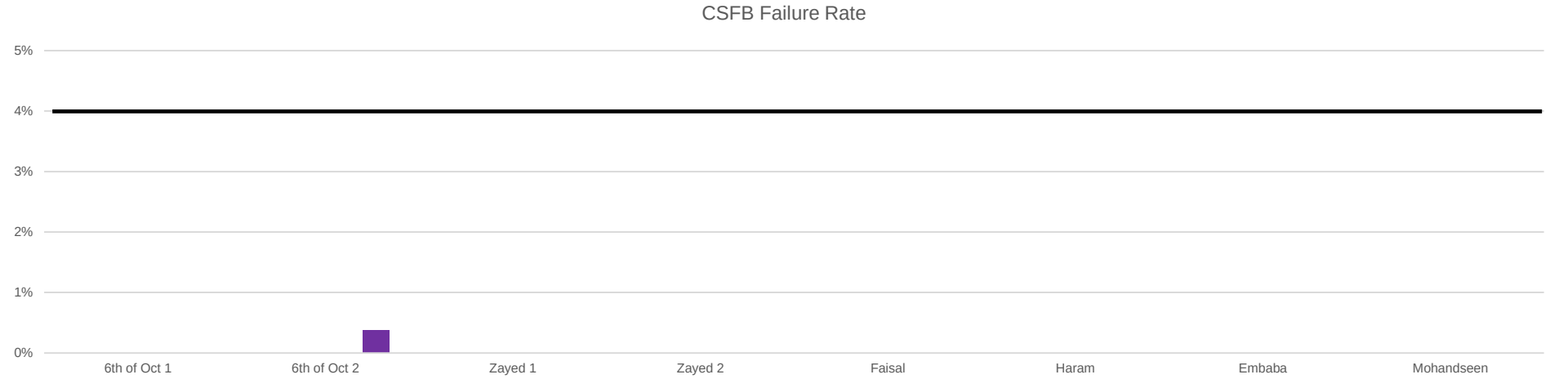
Accessibility: CSFB Failure Rate [%]



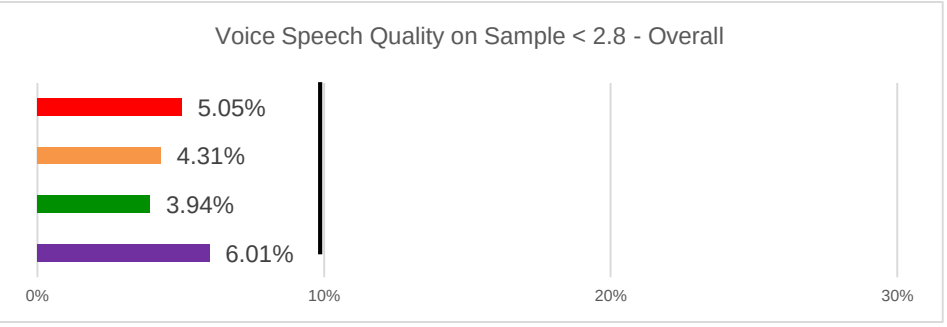


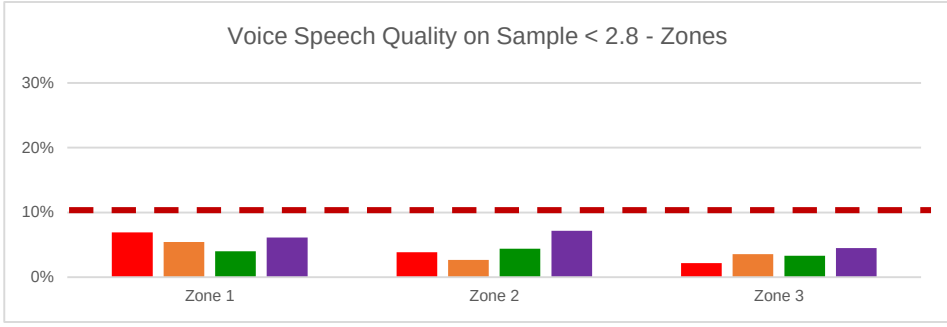


CSFB Failure Rate *represents the ratio between unsuccessful fall back attempt to lower technology than 4G (LTE) and all calls made (both successful & unsuccessful). When there is 4G (LTE) present before starting the session.*

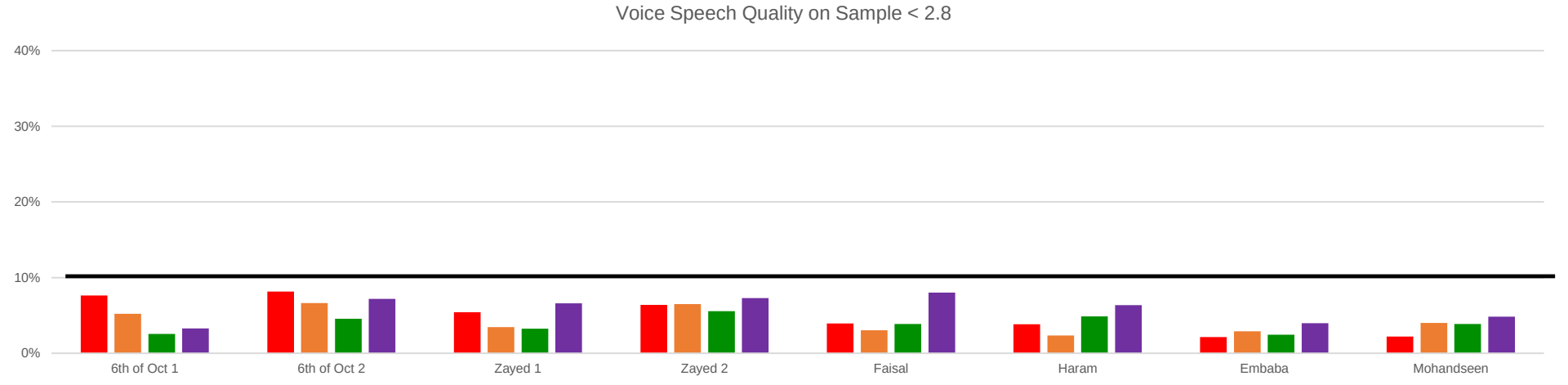


Speech Quality: MOS Voice Speech Quality < 2.8

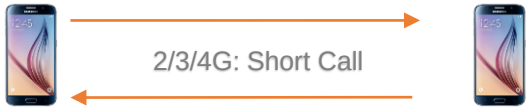


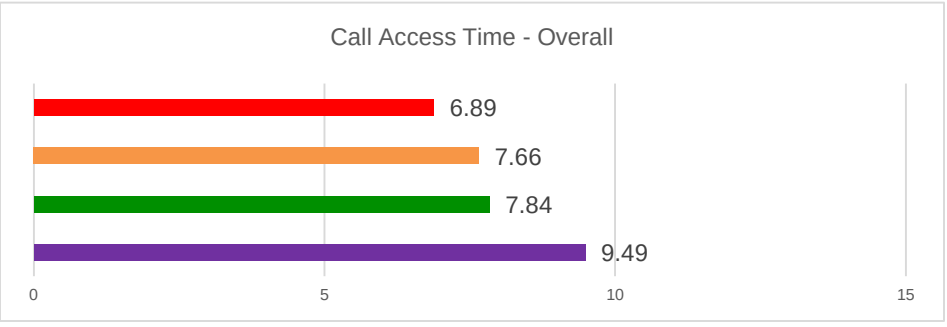


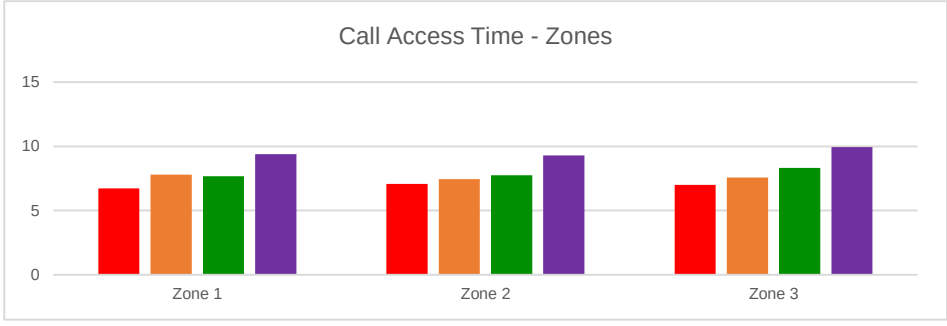
MOS Voice Speech Quality < 2.8 *represents the ratio between total number of MOS samples less than 2.8 all collected MOS samples*



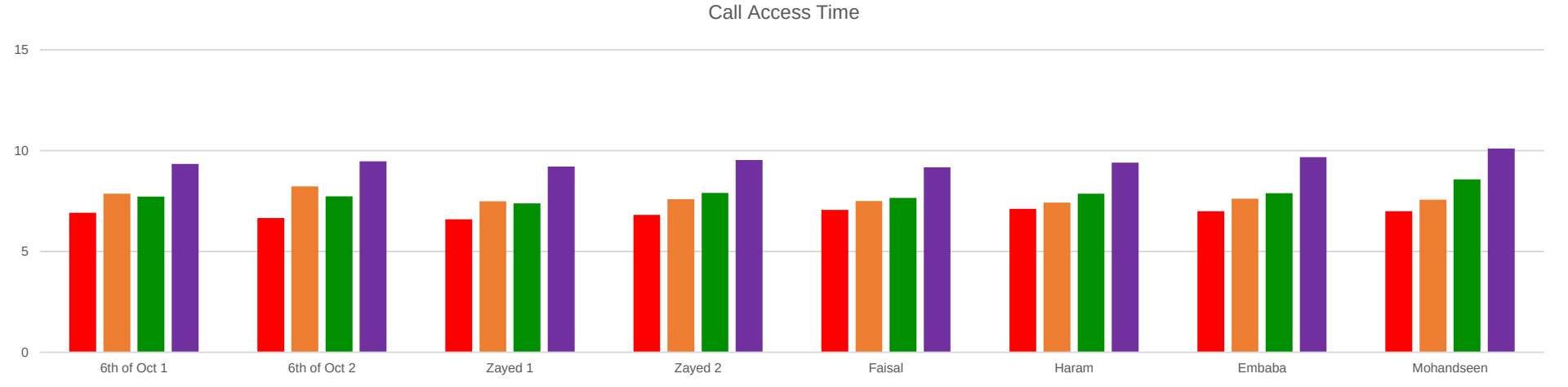
Accessibility: Call Access Time [sec.]



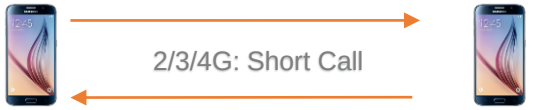


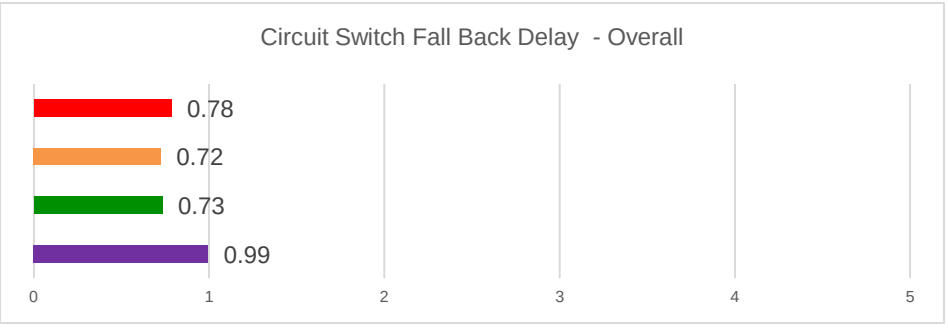


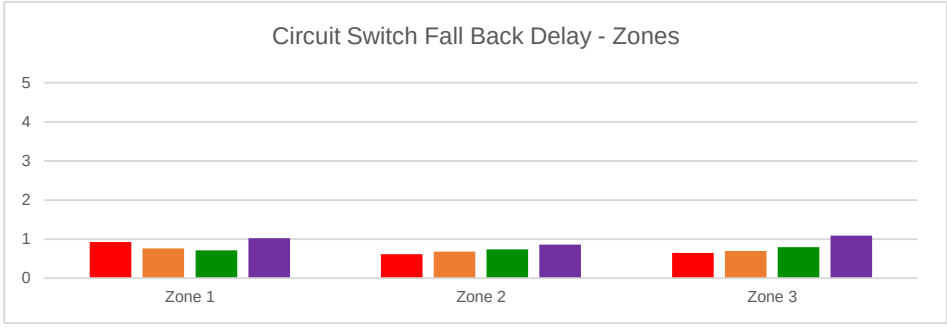
Call Access *represents the period of time elapsed from the sending of a complete destination address (target number) to the setting up of a call to the receiving terminal*.



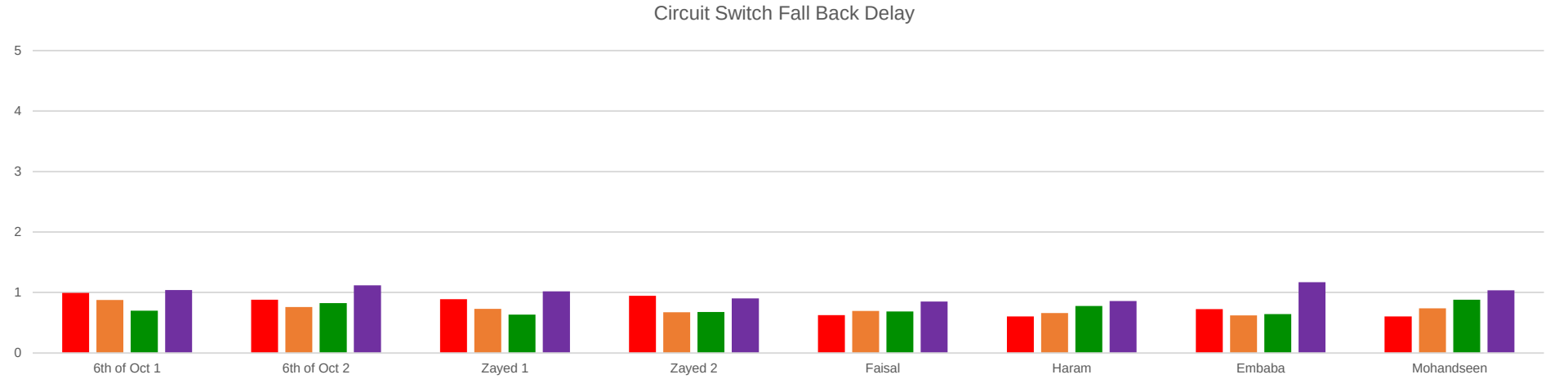
Accessibility: CSFB Delay [sec.]



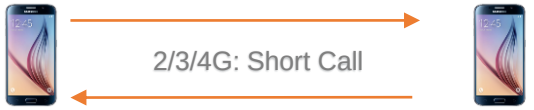


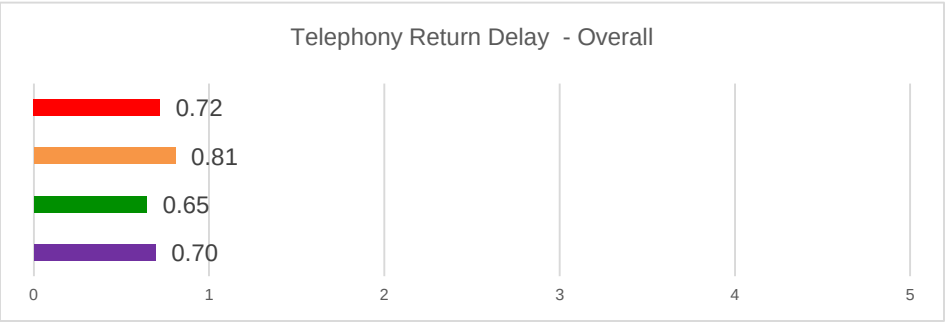


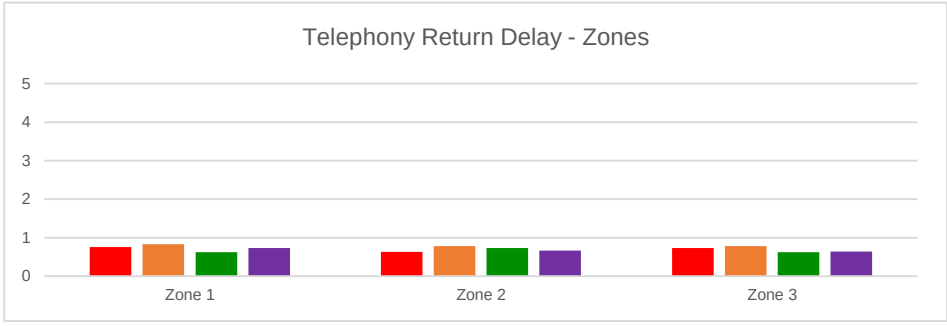
CSFB Delay *represents the period of time to overlay 3G/2G environment instead of handling calls in 4G (LTE). Depending on the CSFB strategy.*



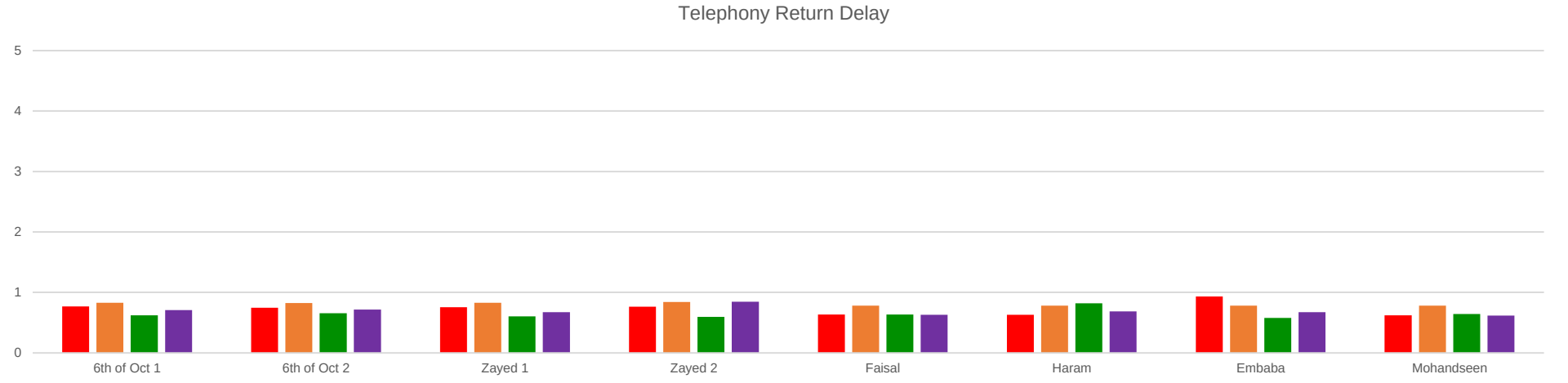
Accessibility: Telephony Return Delay [sec.]





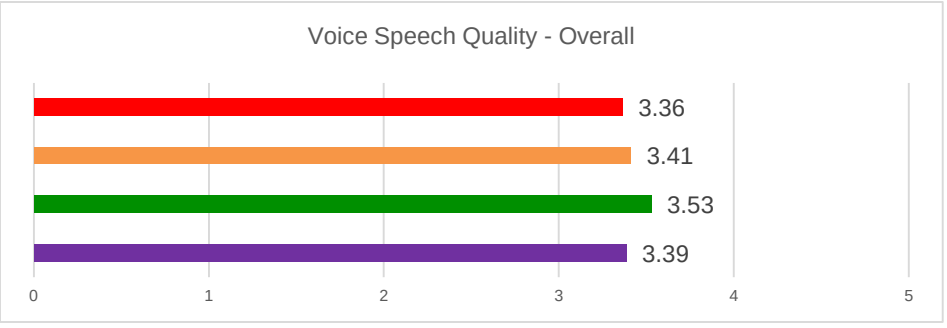


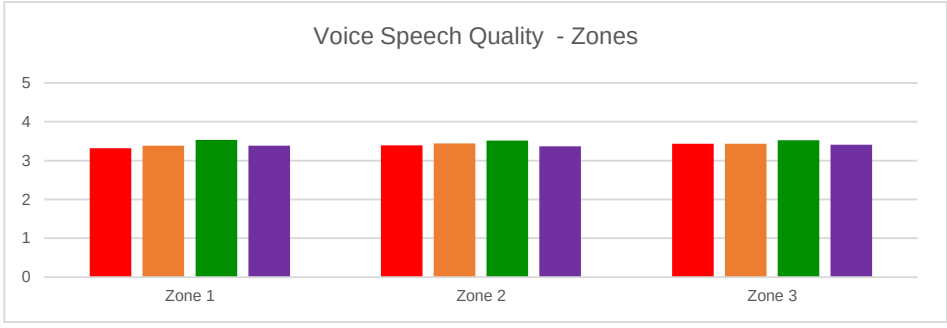
Telephony Return Delay *measures the time that a UE uses to re-join the LTE (4G) network after call end*

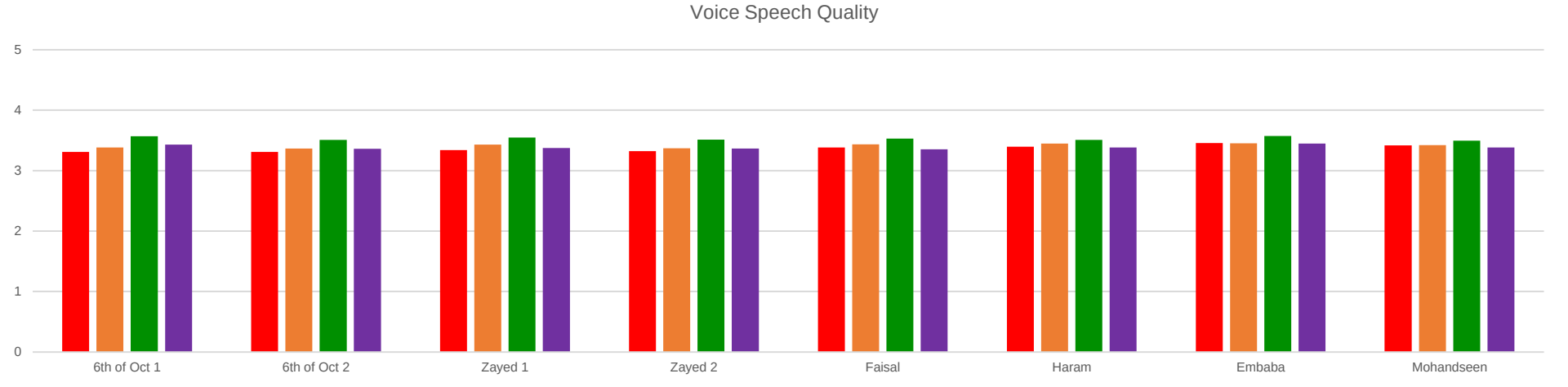


Voice Speech Quality KPI’s

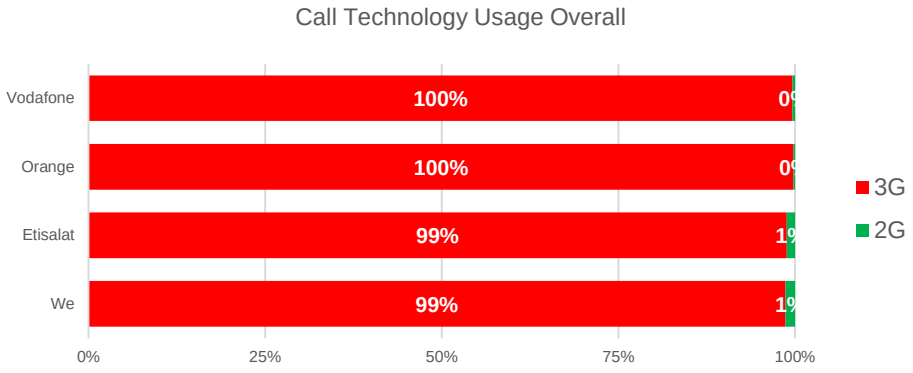
Speech Quality: MOS Scores





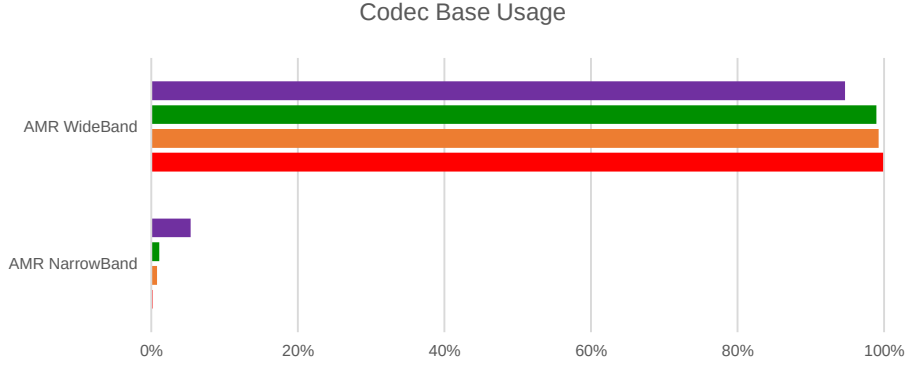


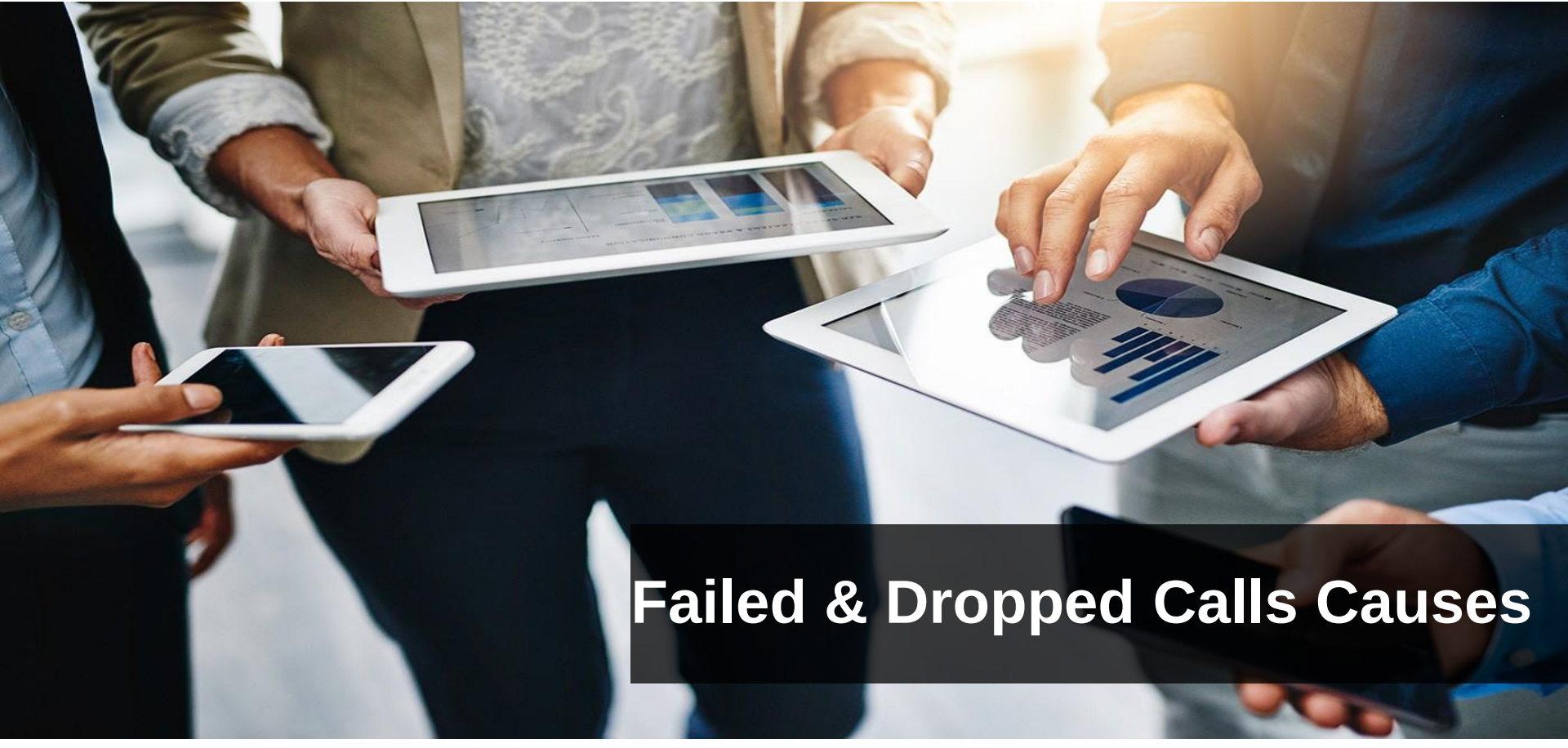
Speech Quality: Call technology Usage & Codec Base Usage



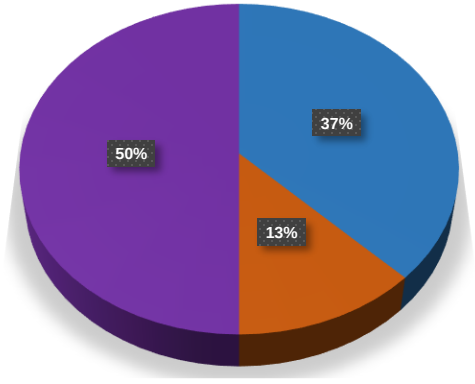
Call technology Usage *represents the call technology used over call period. The more calls on 3G (UMTS) the better MOS served.*

Codec Base Usage *represents the codec used over the call where AMR wideband (AMR WB) leads to better voice quality experience by the end user than the AMR Narrowband (AMR NB)*

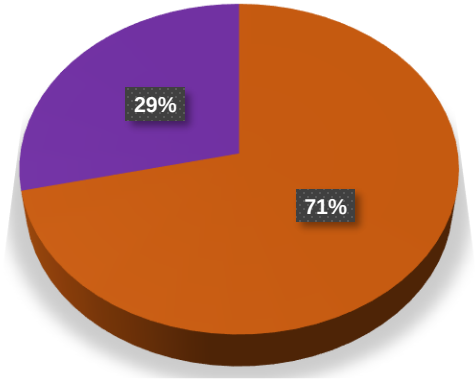


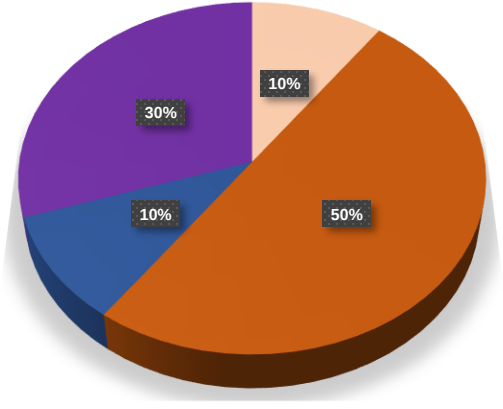

Failed & Dropped Calls Causes

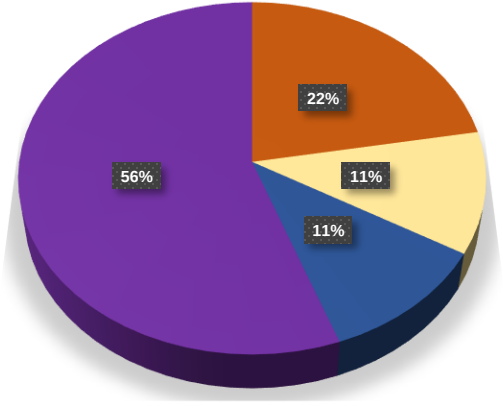
Analysis: Dropped Calls Causes



No drop calls

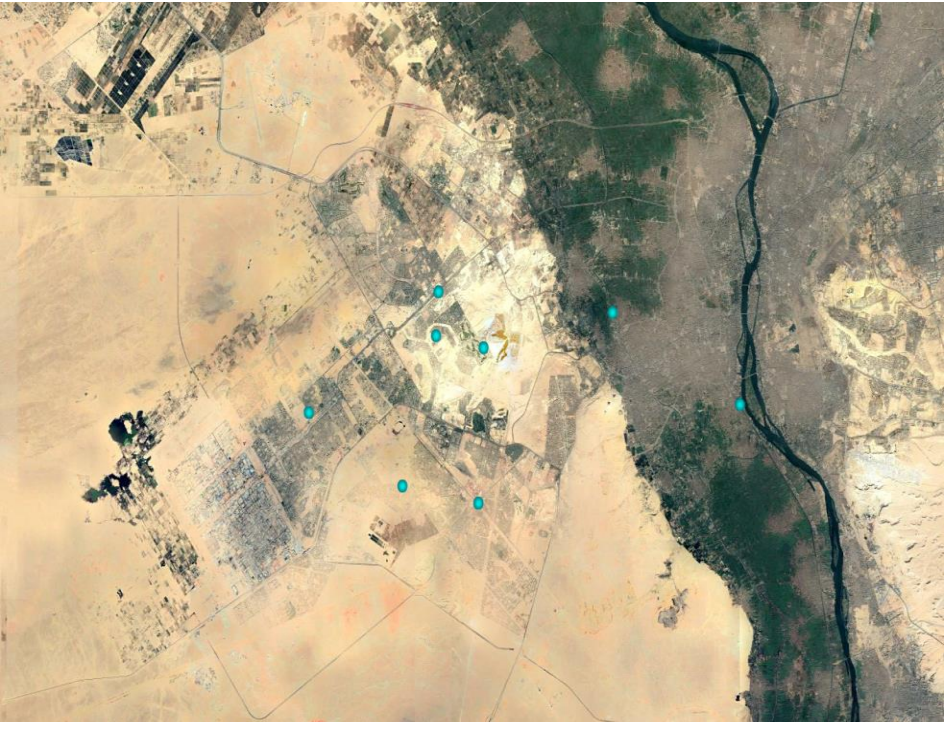




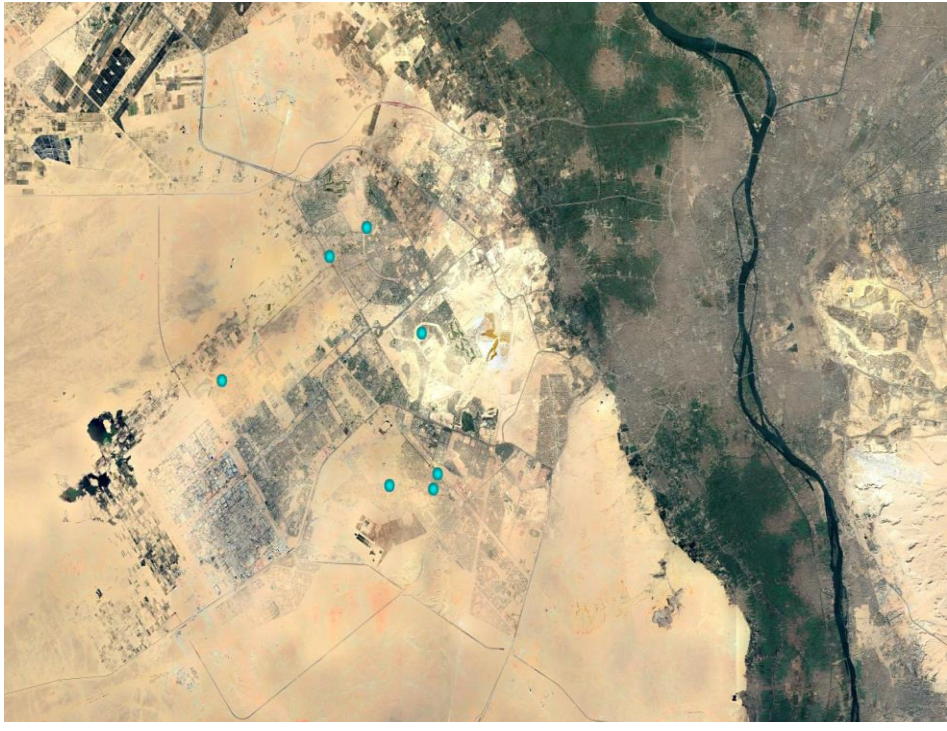


All Operators: Dropped Calls Locations 1/2

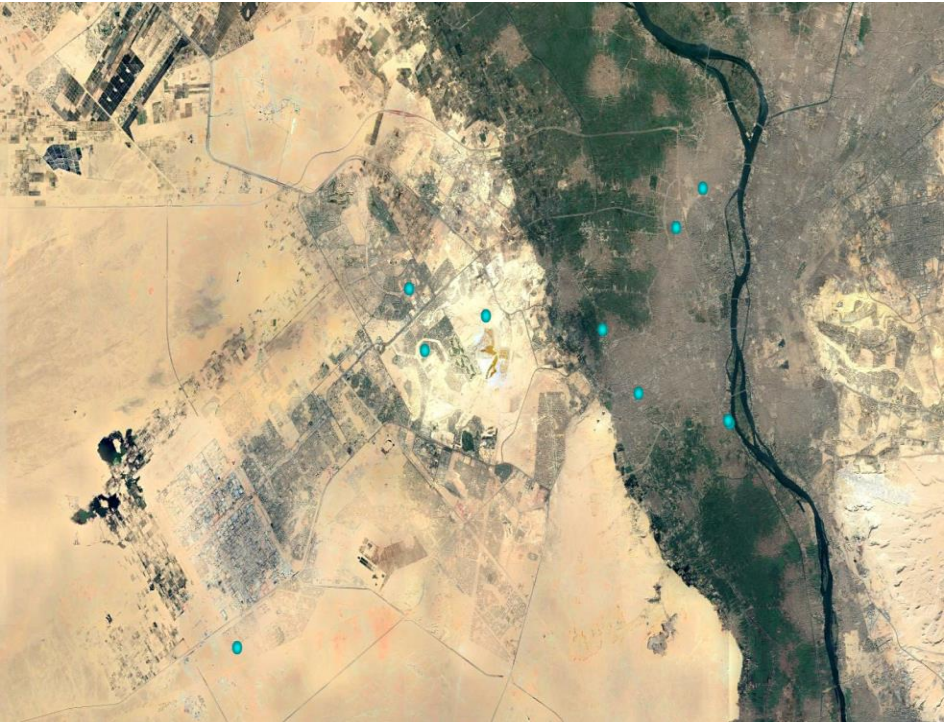
vodafone

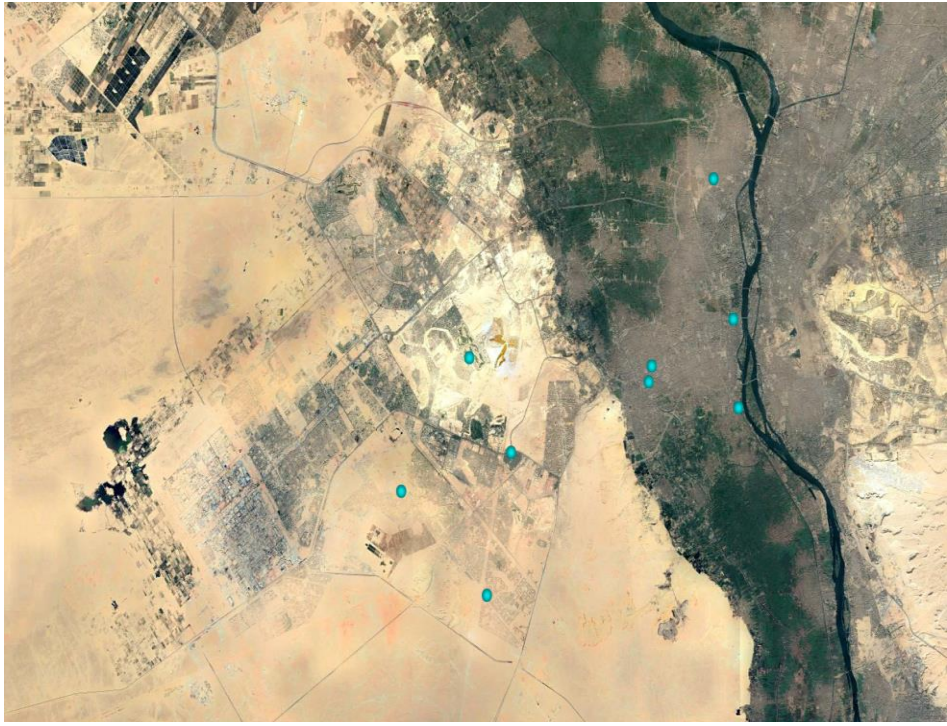


orange



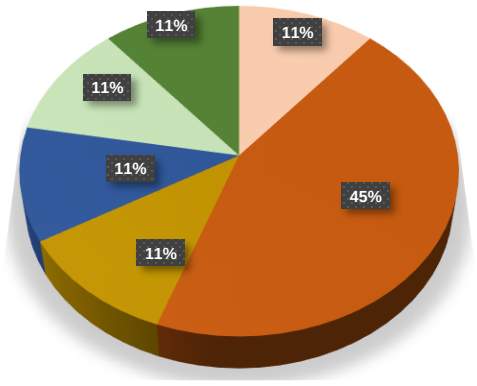
All Operators: Dropped Calls Locations 2/2





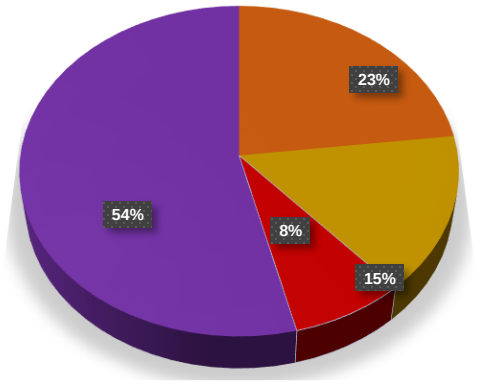
Analysis: Failed Calls Causes

vodafone



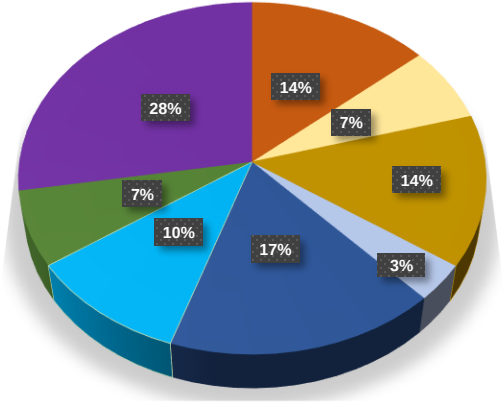
- 3G Coverage
- 3G Quality
- CSFB Issue
- No Service
- Other
- paging Issue

orange



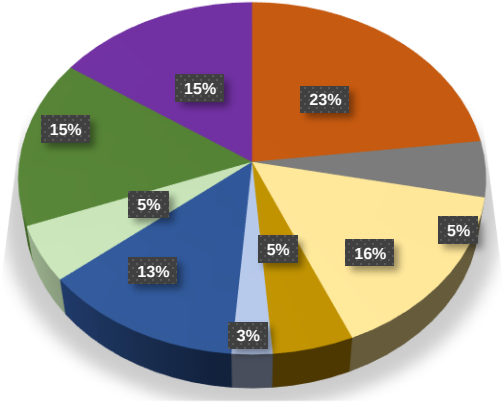
- 3G Quality
- CSFB Issue
- Mobility Issue
- RAN Issue

etisalat



- 3G Quality
- core network
- CSFB Issue
- Mobility Issue
- No Service
- Other
- paging Issue
- RAN Issue

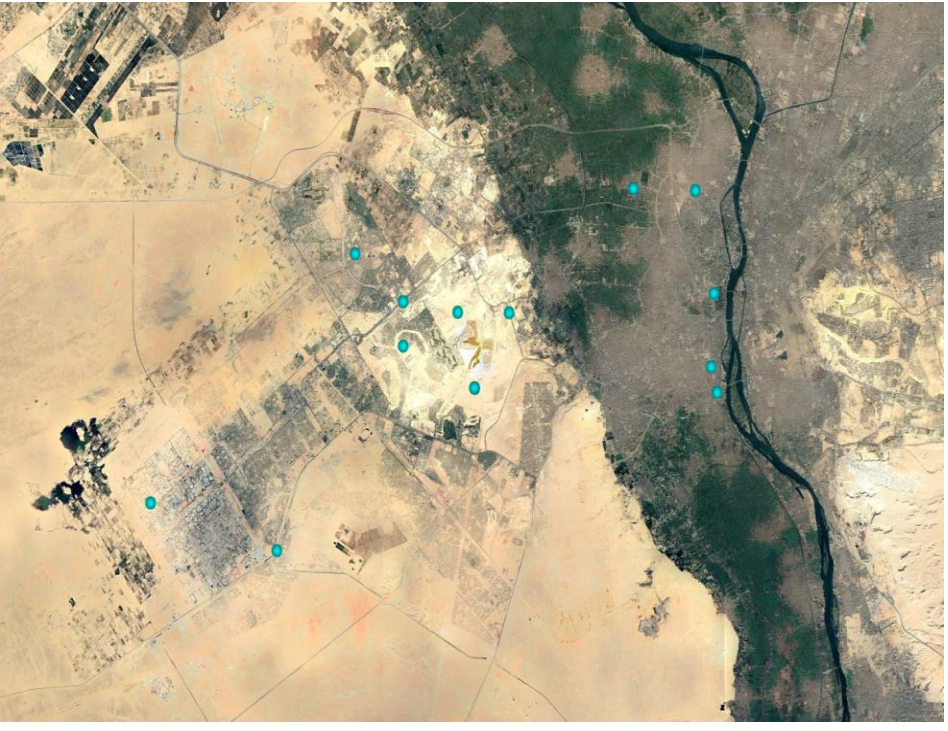
we



- 3G Quality
- 4G Quality
- core network
- CSFB Issue
- Mobility Issue
- No Service
- Other
- paging Issue
- RAN Issue

All Operators: Blocked Calls Locations 1/2

vodafone



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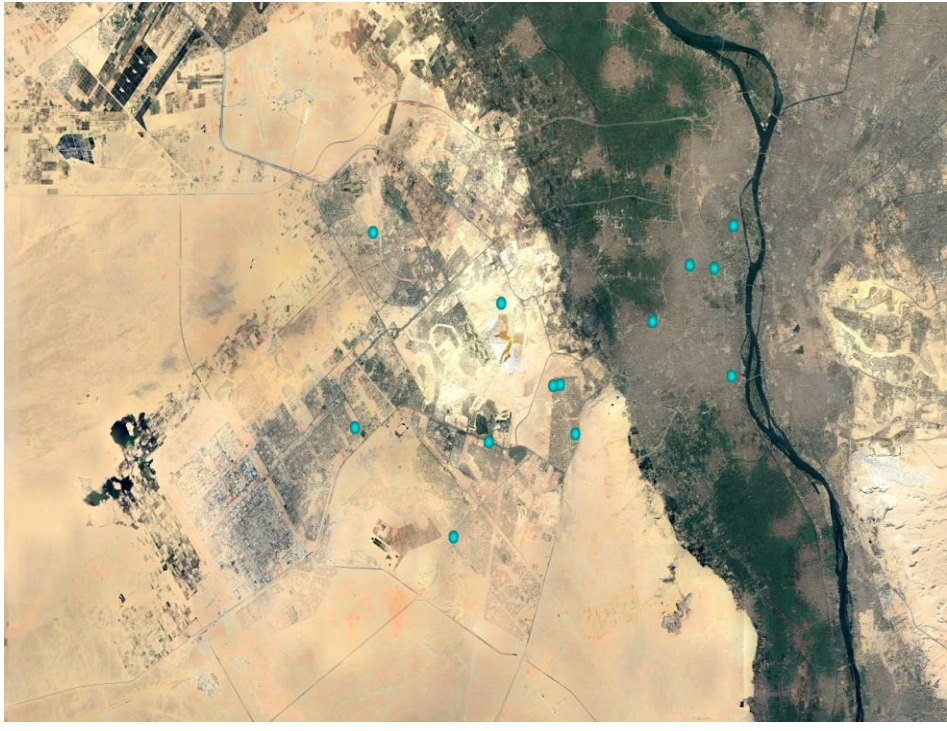
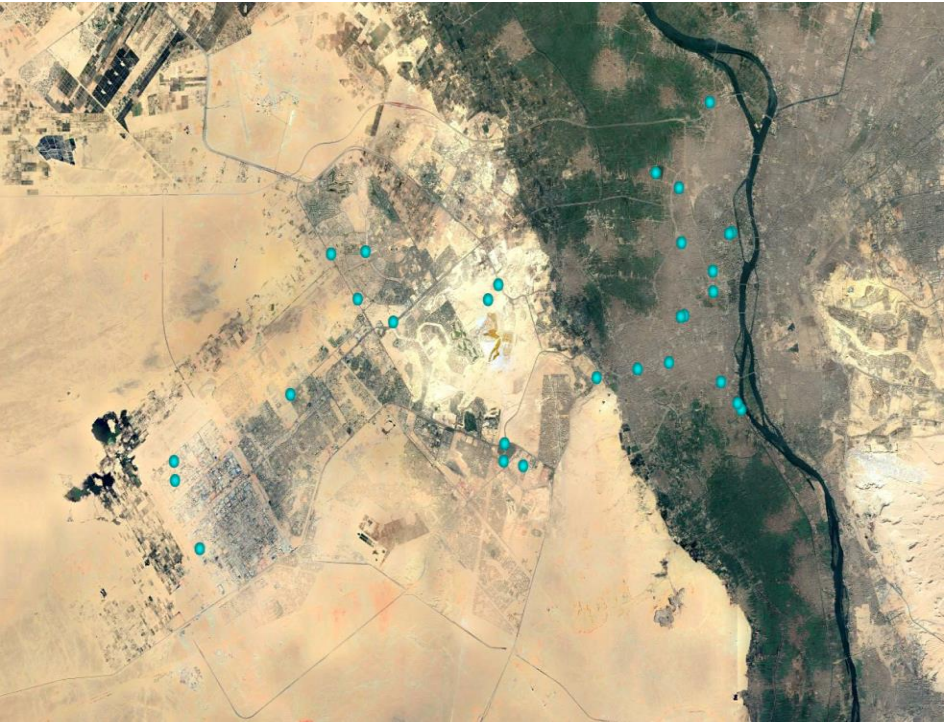
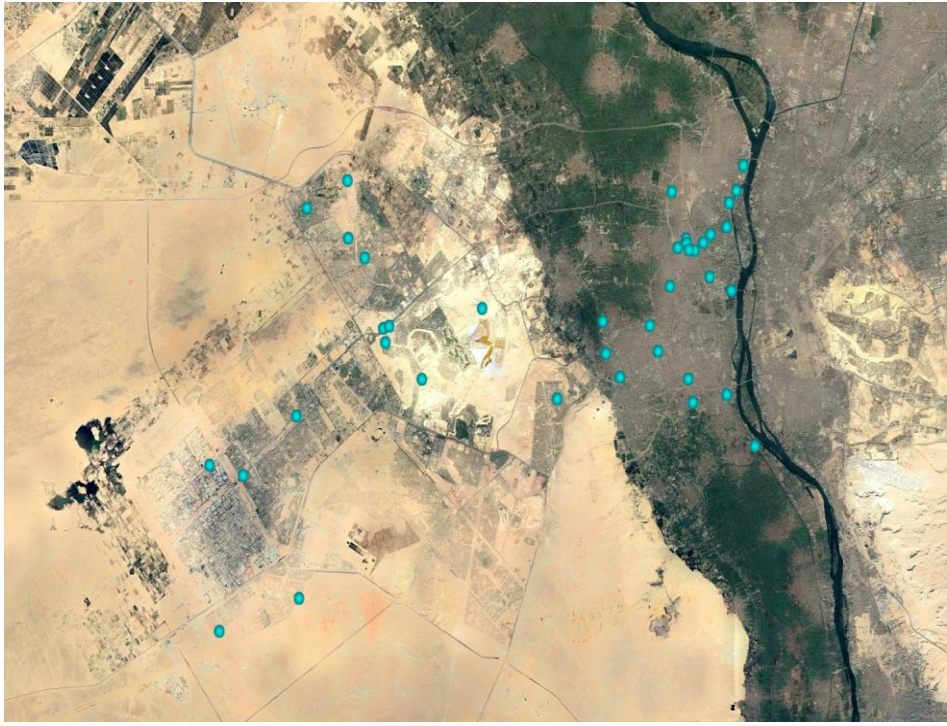


All Operators: Blocked Calls Locations 2/2



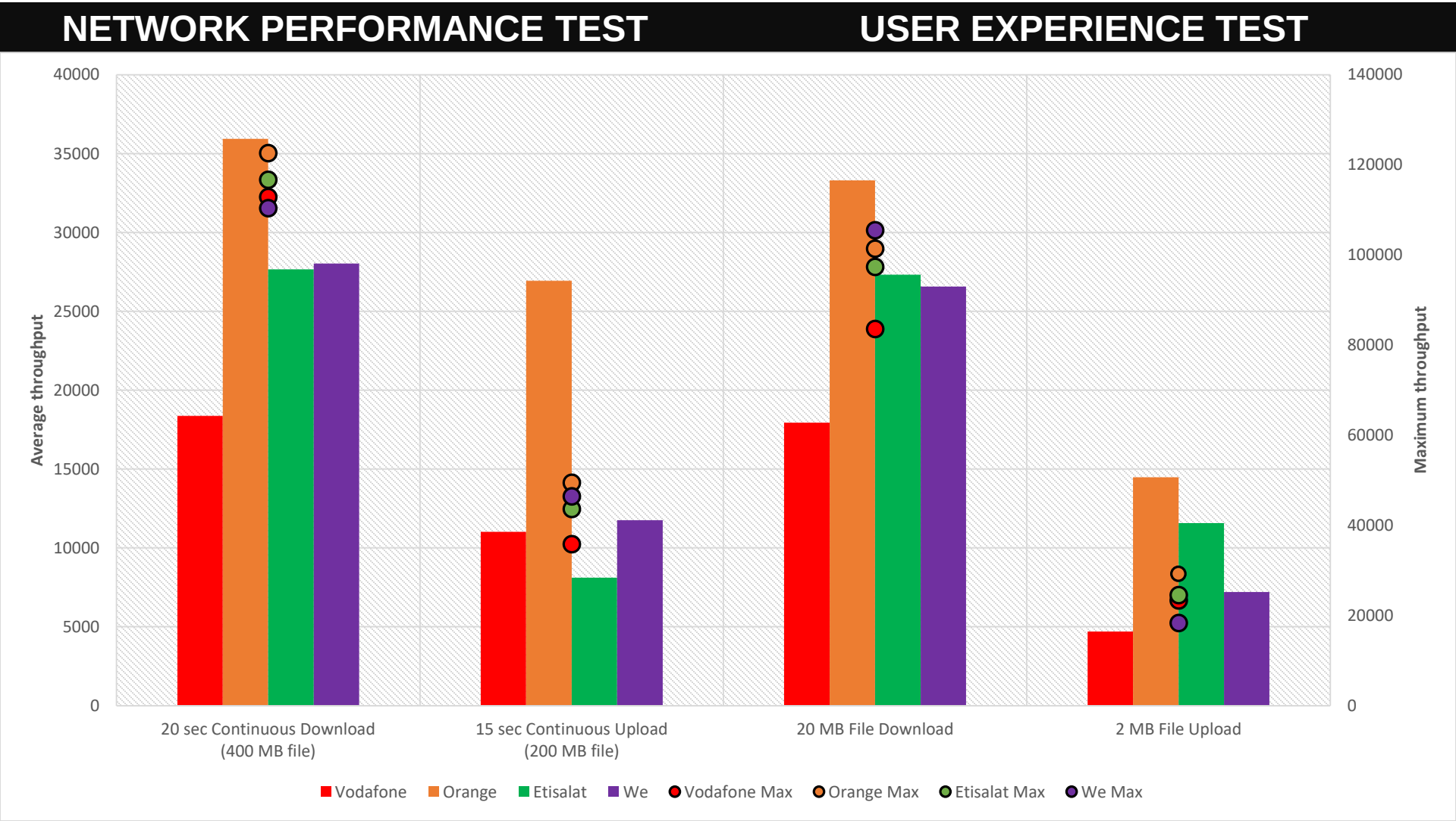


Agenda

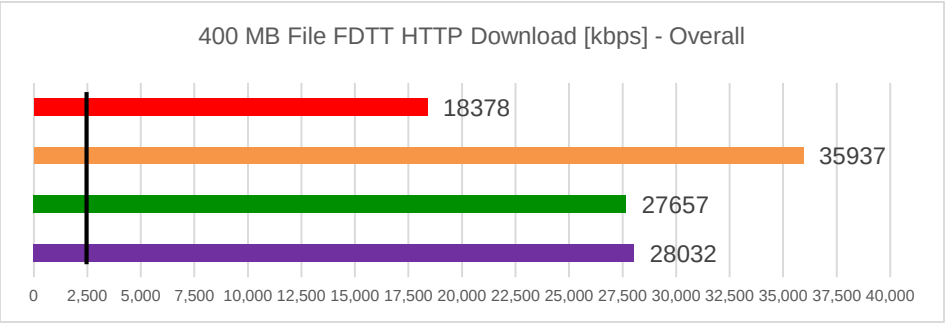
1. *Quantitative Information*
2. *Voice Service Quality & Performance – Cairo*
3. *Data Service Quality & Performance – Cairo*
4. *Voice Service Quality & Performance - Giza*
5. ***Data Service Quality & Performance – Giza***
6. *Voice Service Quality & Performance - Alexandria*
7. *Data Service Quality & Performance - Alexandria*
8. *Voice Service Quality & Performance - Delta*
9. *Data Service Quality & Performance – Delta*
10. *Voice Service Quality & Performance – Upper Egypt*
11. *Data Service Quality & Performance – Upper Egypt*
12. *Annexes*

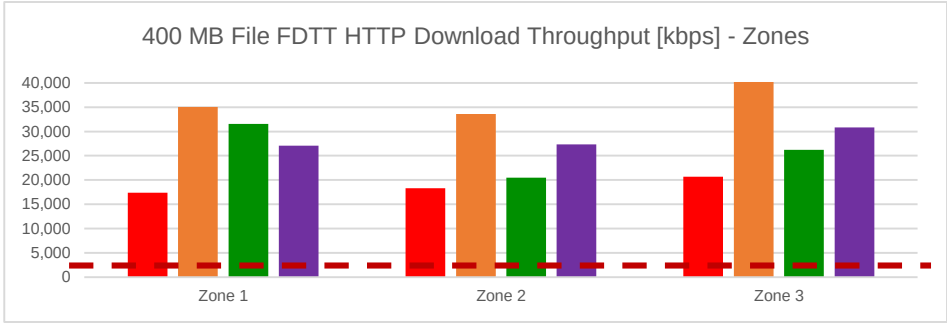
Data Service KPI’s

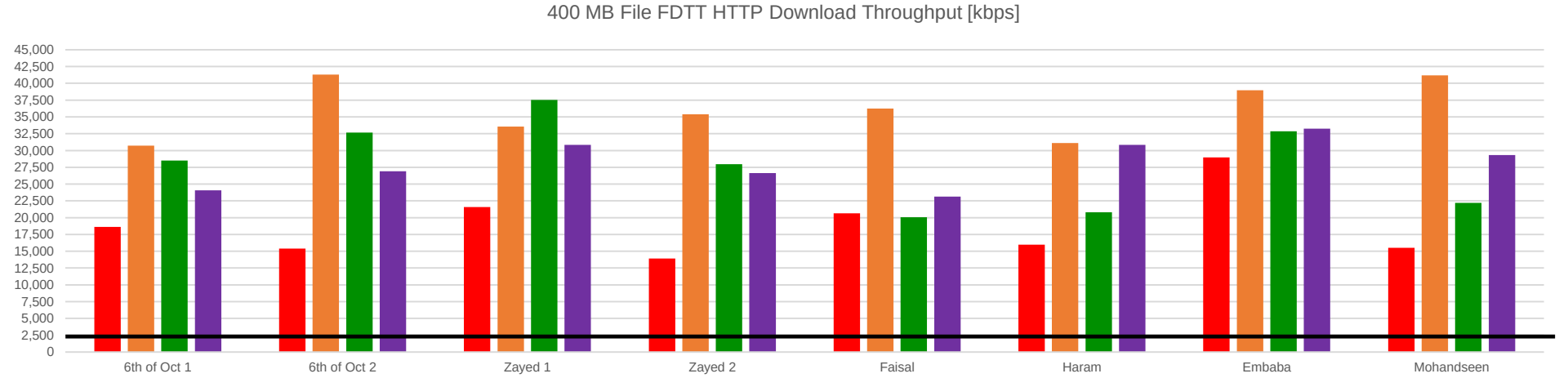
Free Mode Throughput Per Test Type



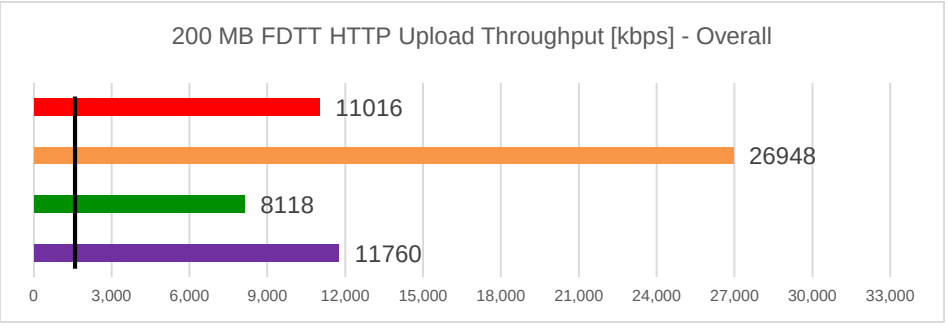
FDTT HTTP Download Transfer Throughput – Network Performance

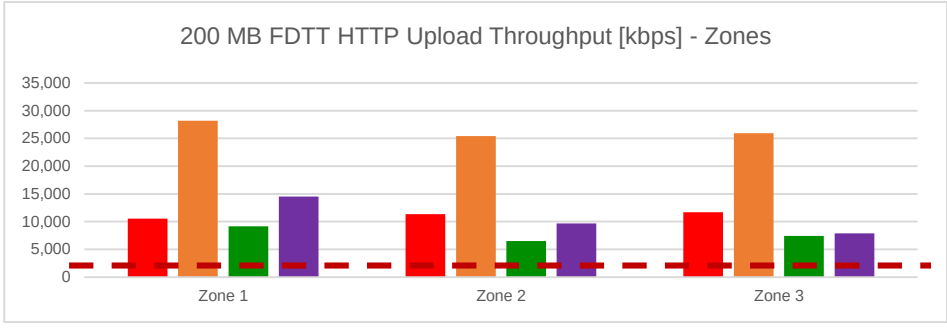


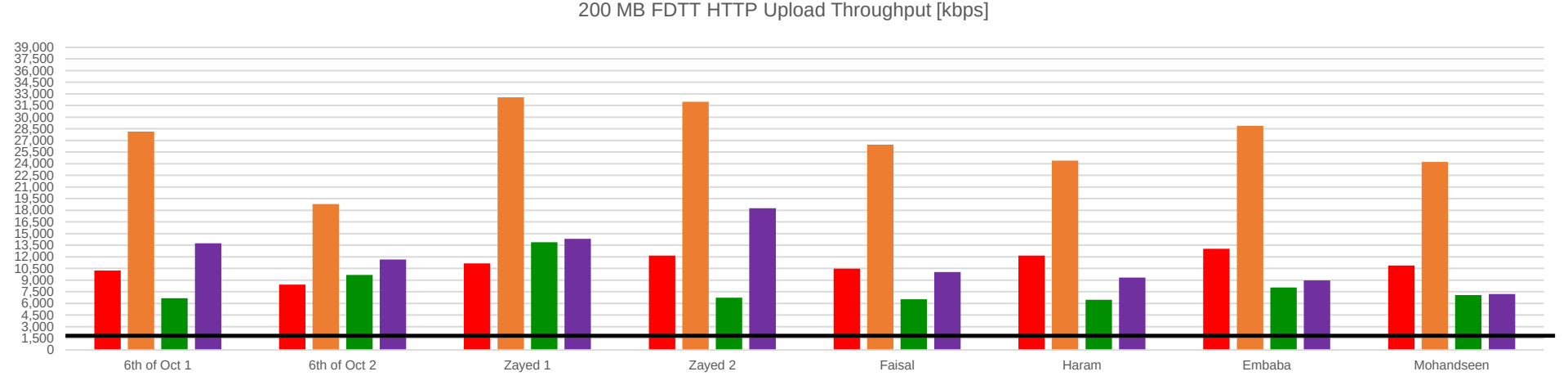




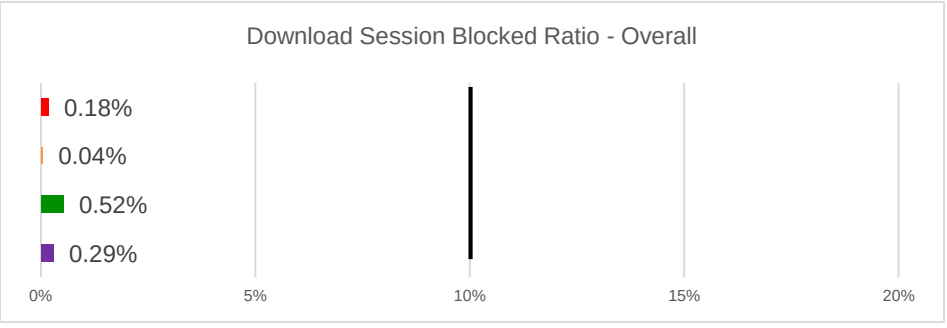
FDTT HTTP Upload Transfer Throughput – Network Performance

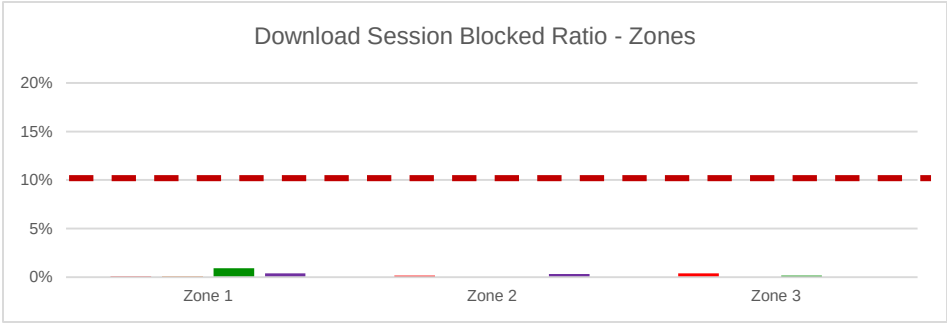


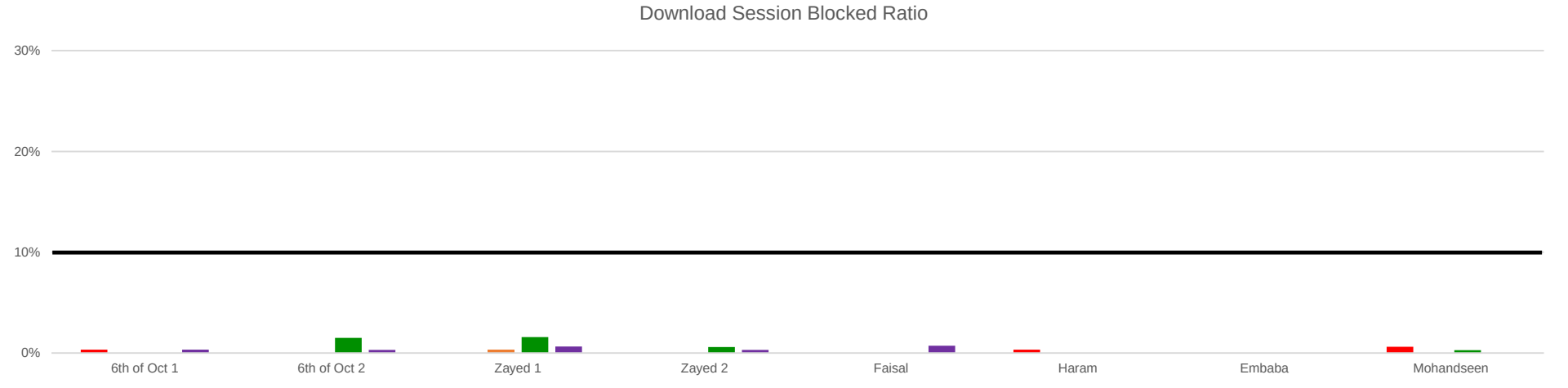




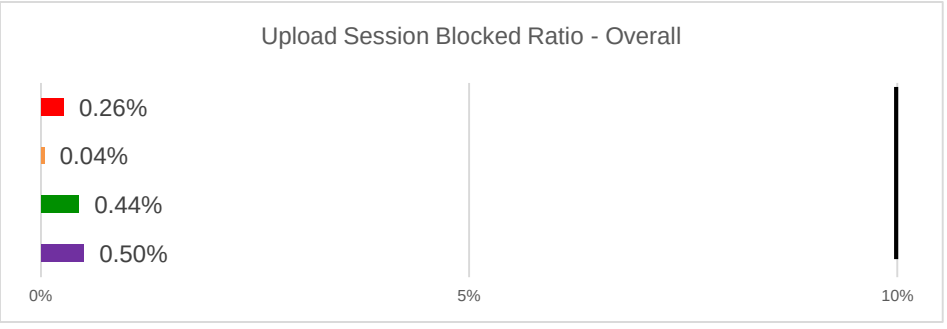
HTTP Download Session Blocked Rates

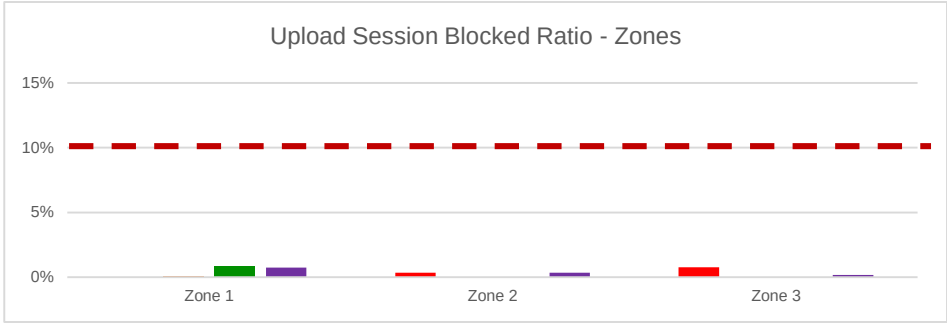


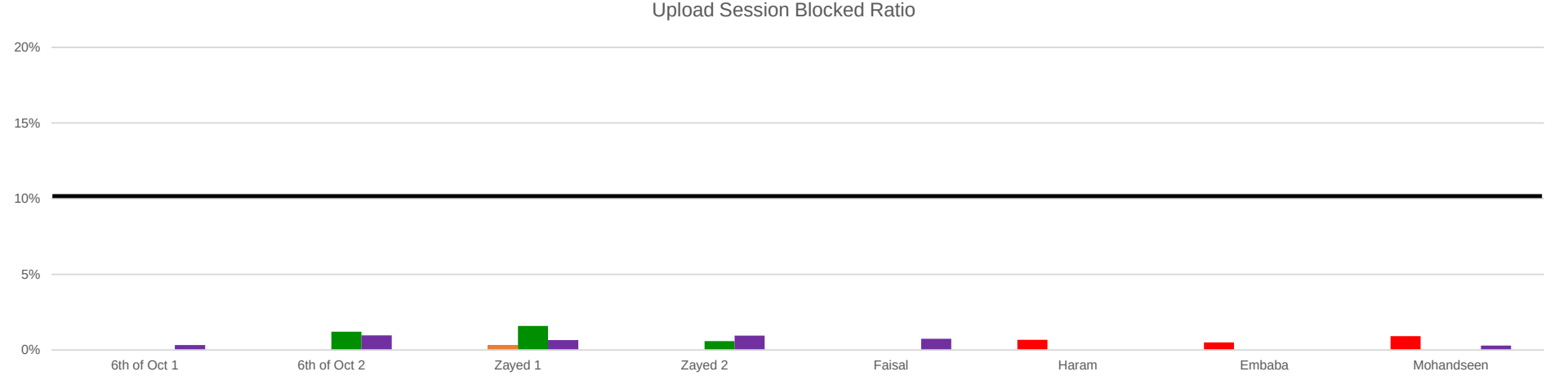




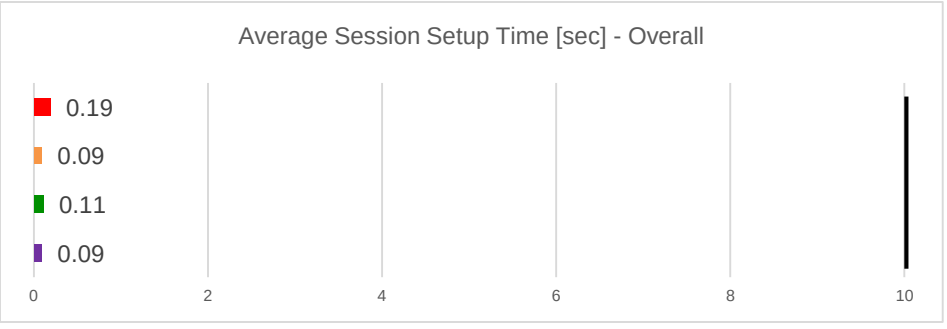
HTTP Upload Session Blocked Rates

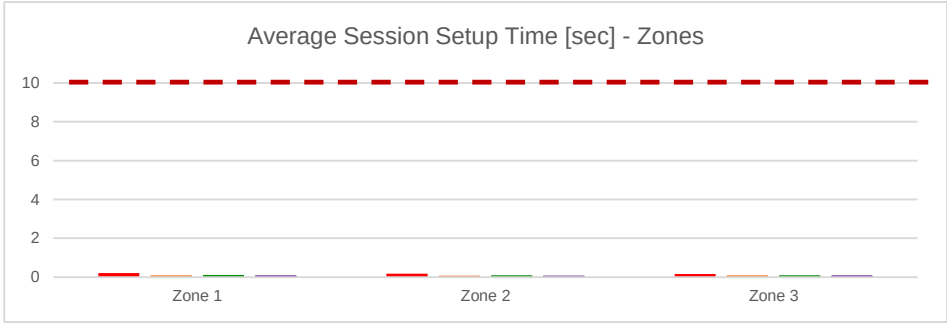


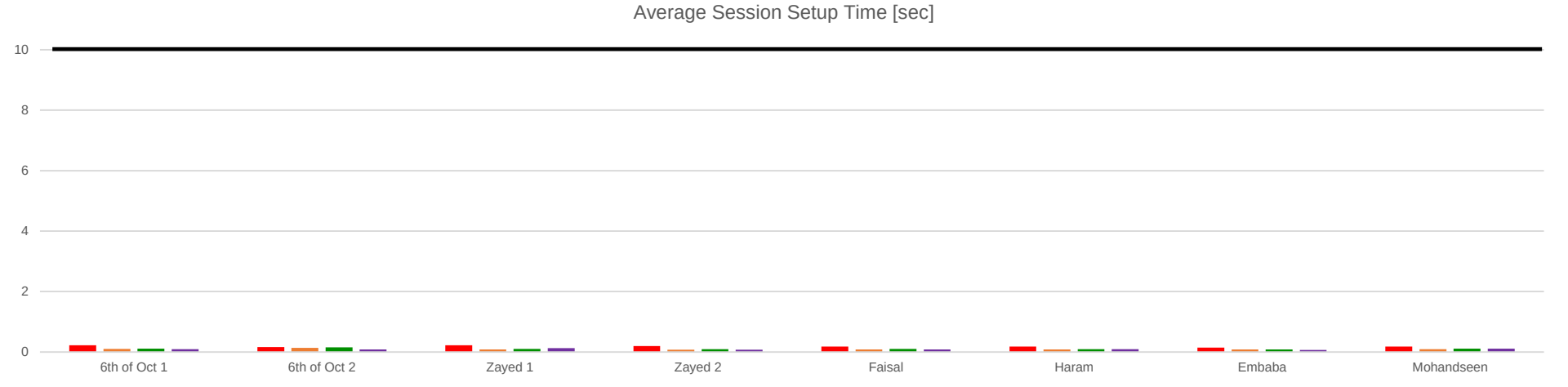




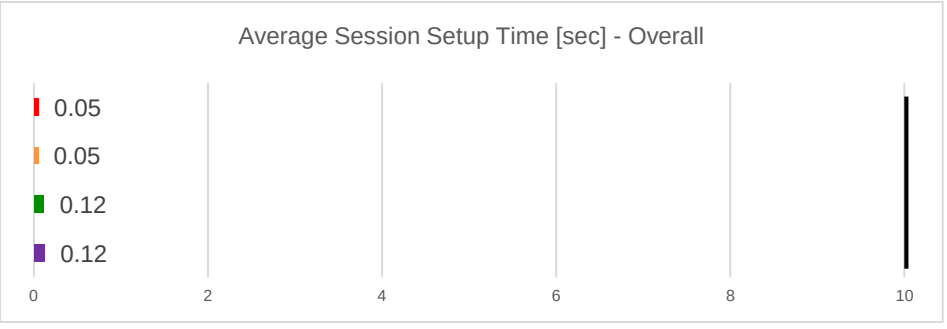
HTTP Download Average Session Setup Time

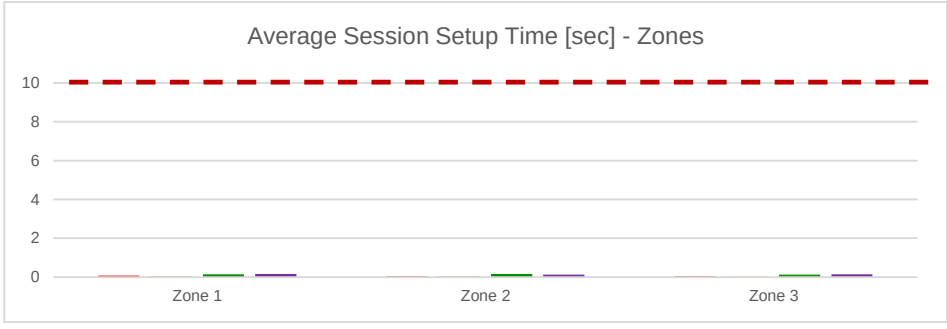


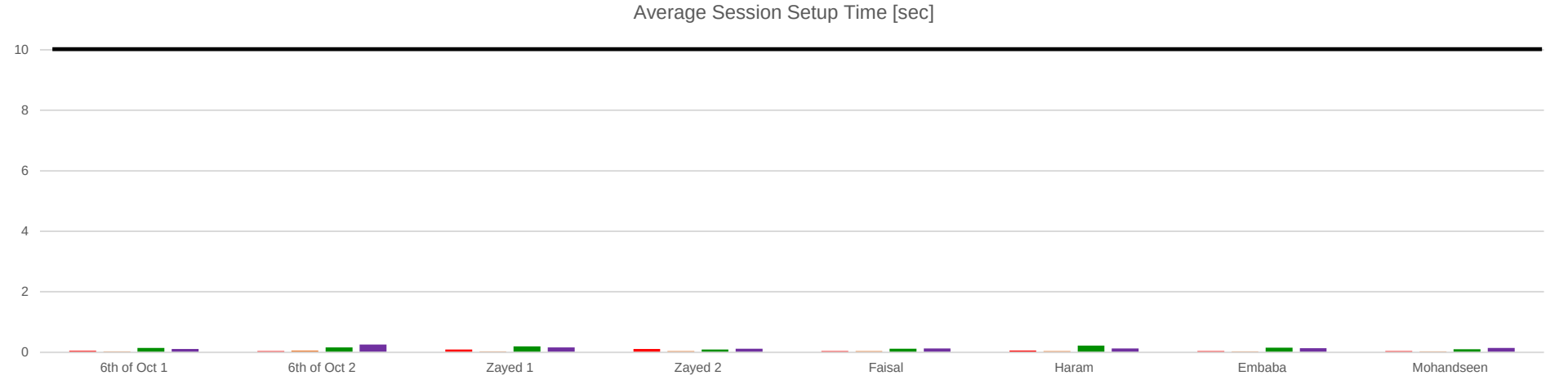




HTTP Upload Average Session Setup Time [sec]

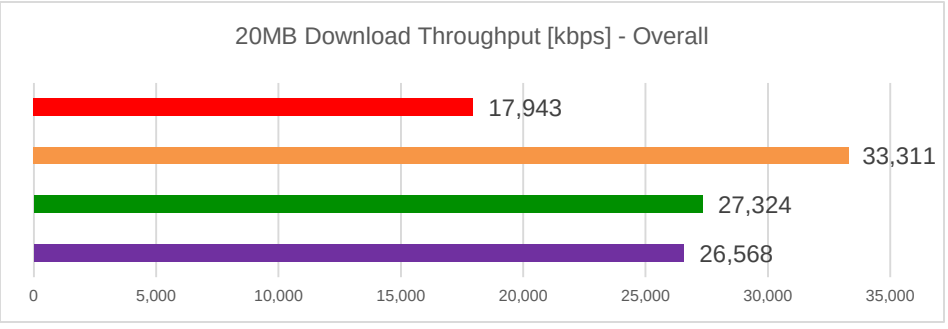


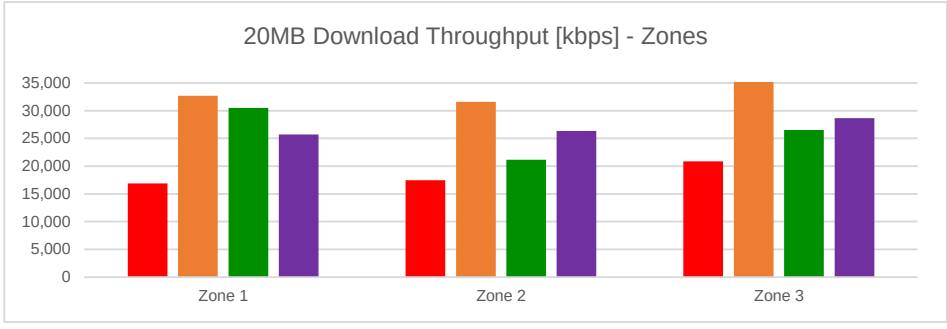


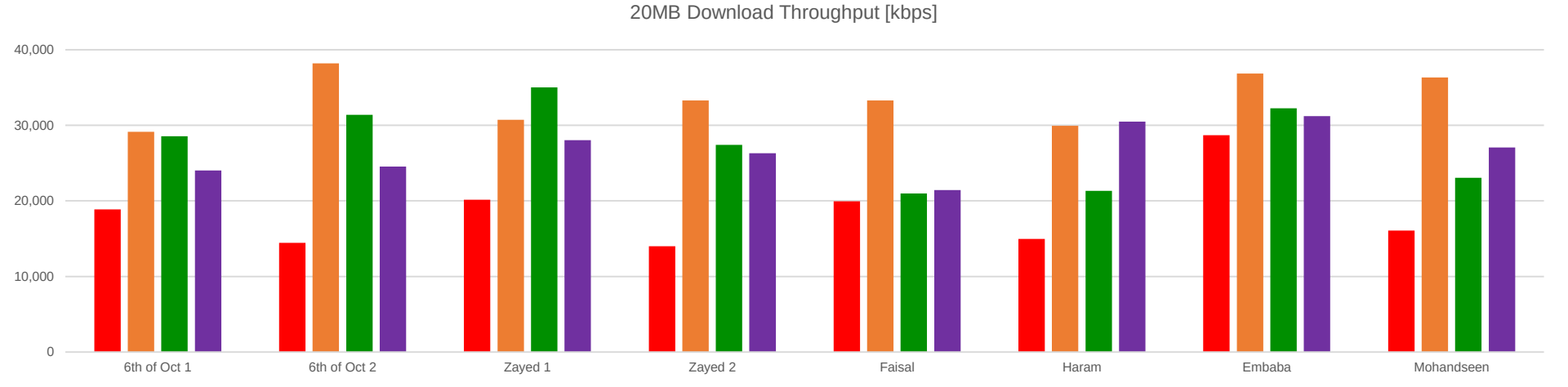


Throughput KPI’s – Customer Experience

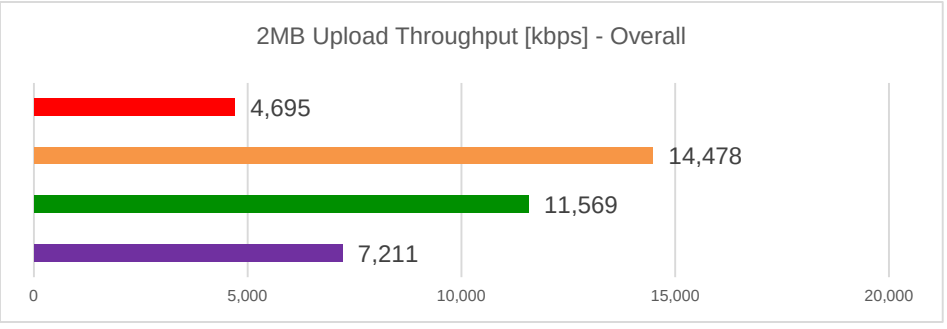
HTTP Download Throughput – Customer Experience

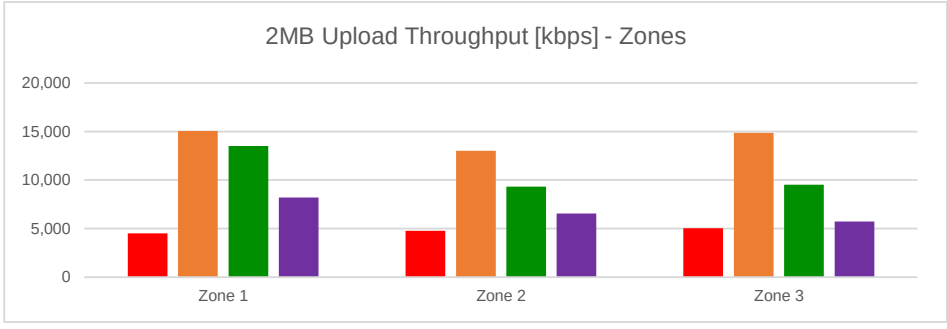


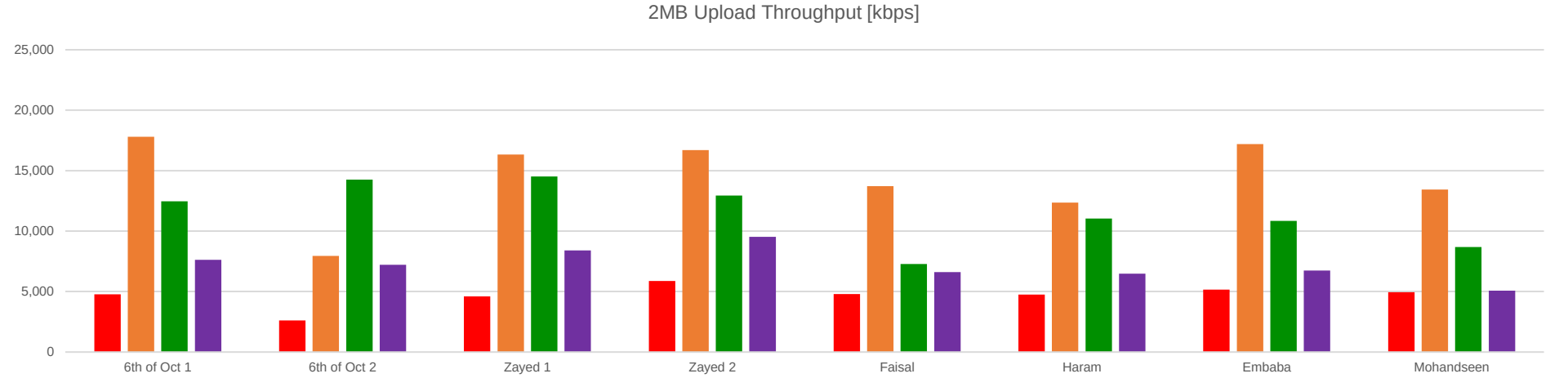


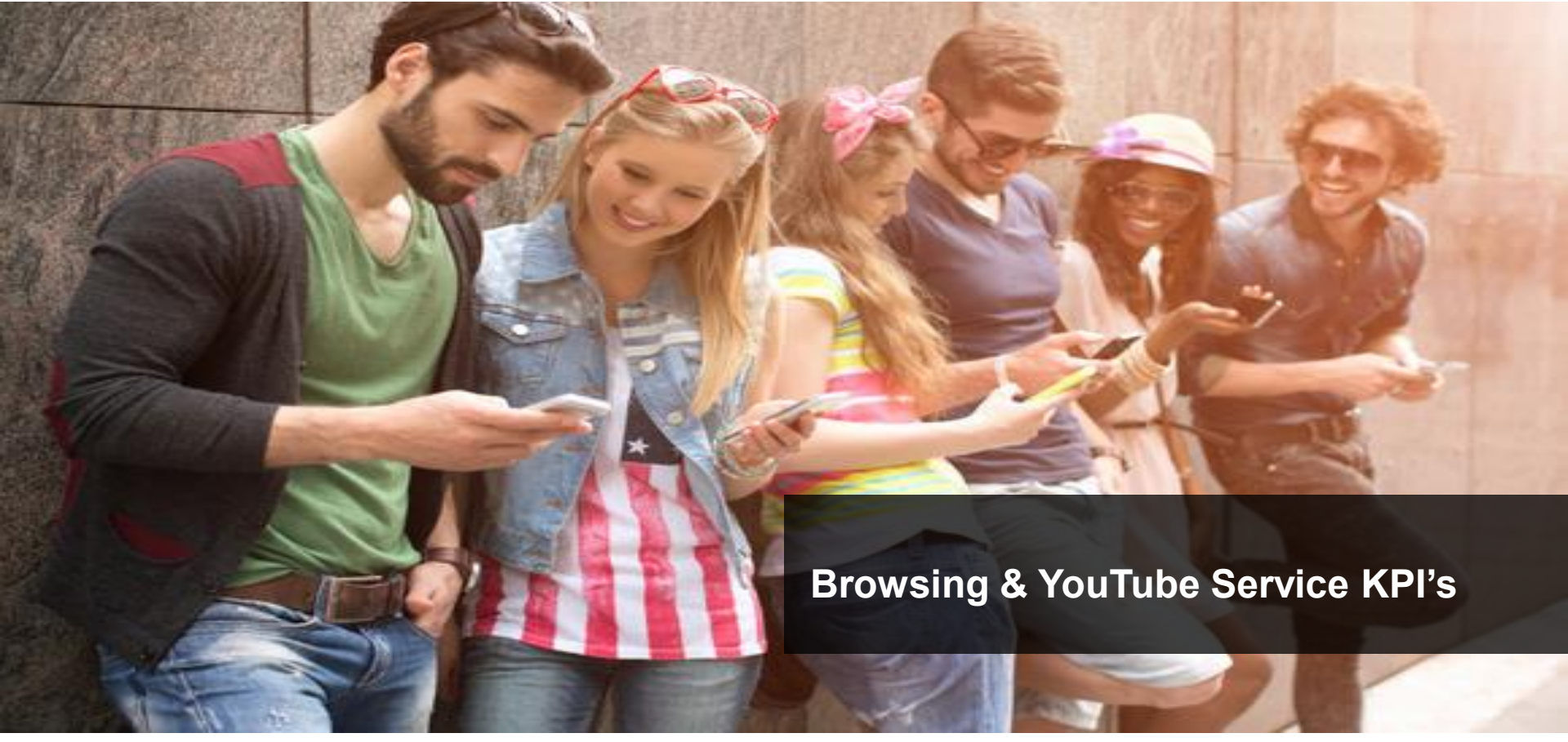


HTTP Upload Throughput – Customer Experience



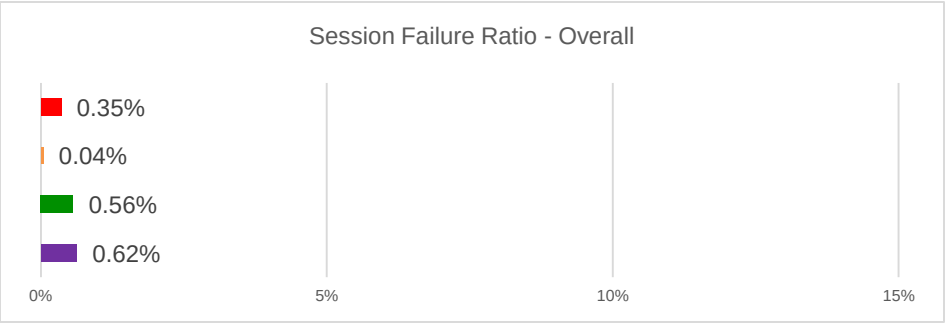


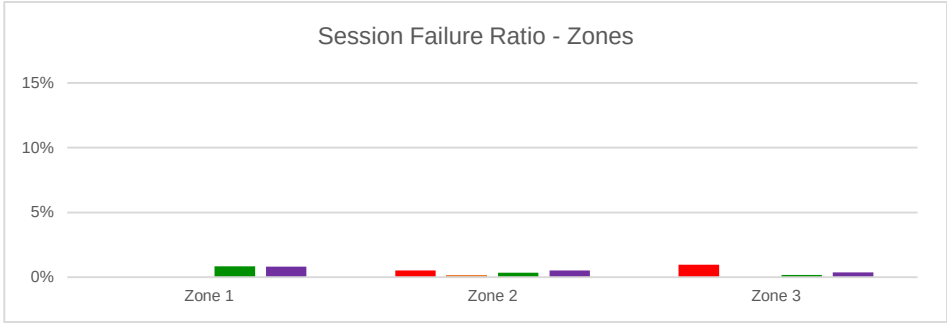


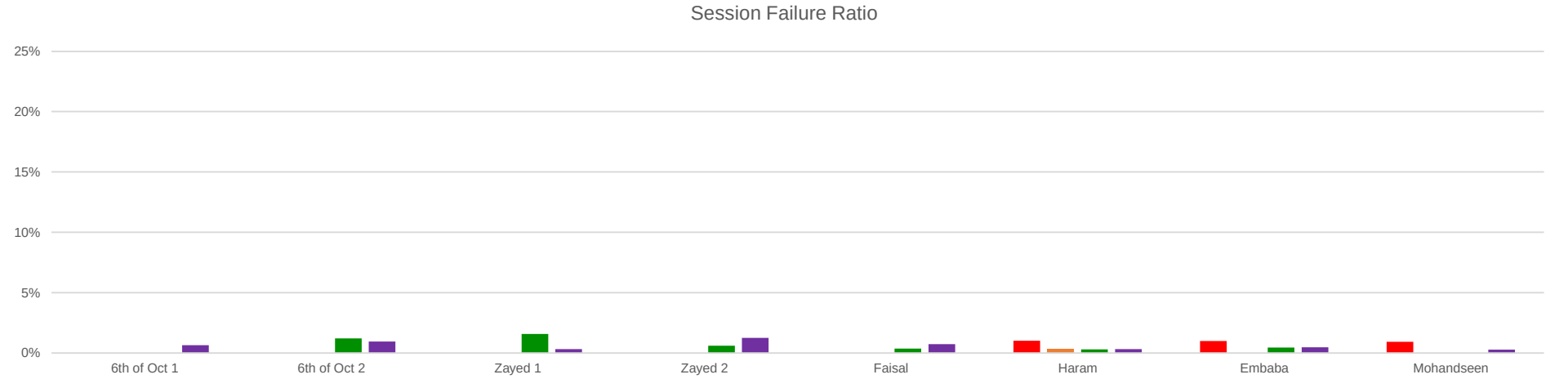


Browsing & YouTube Service KPI’s

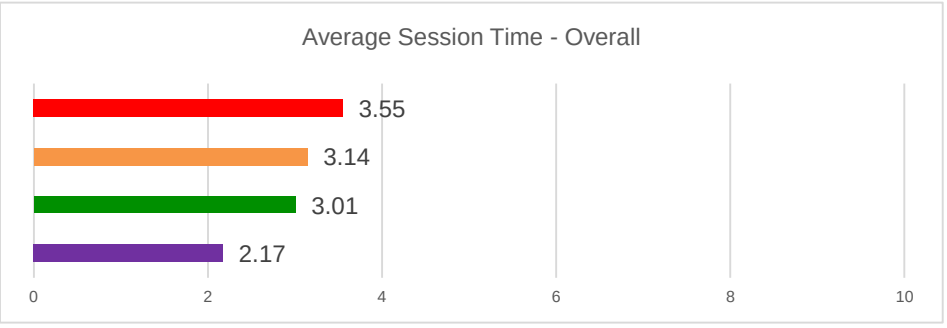
Session Failure Ratio

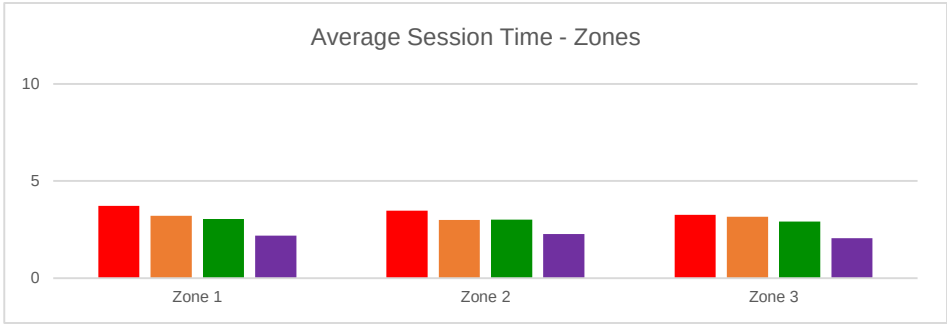


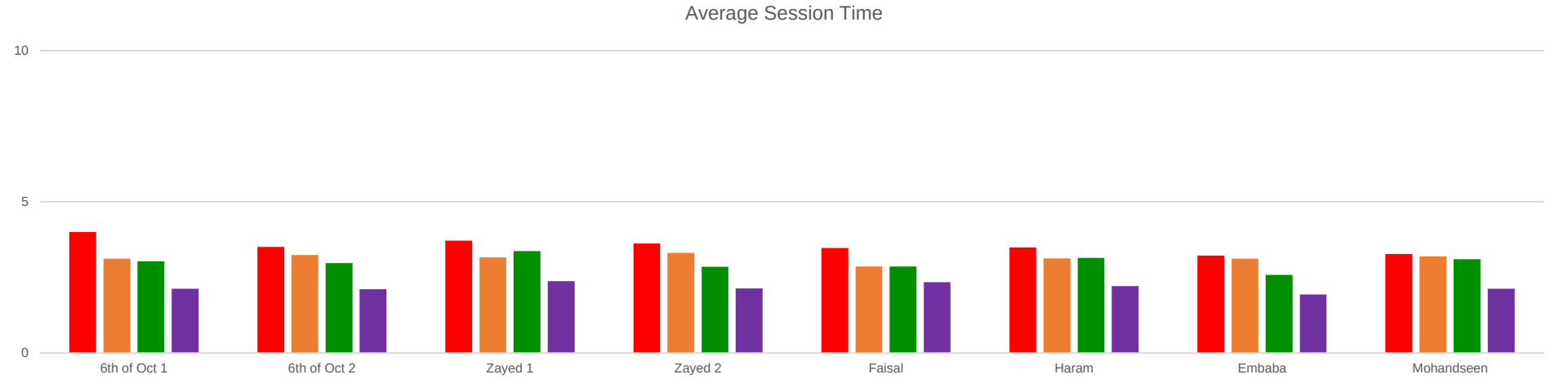




Session Time







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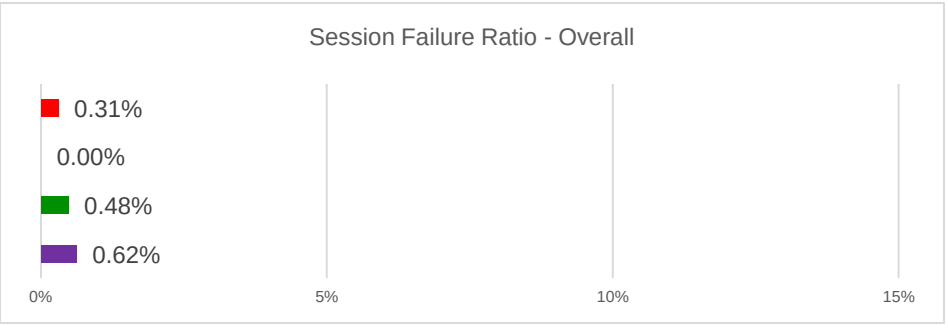
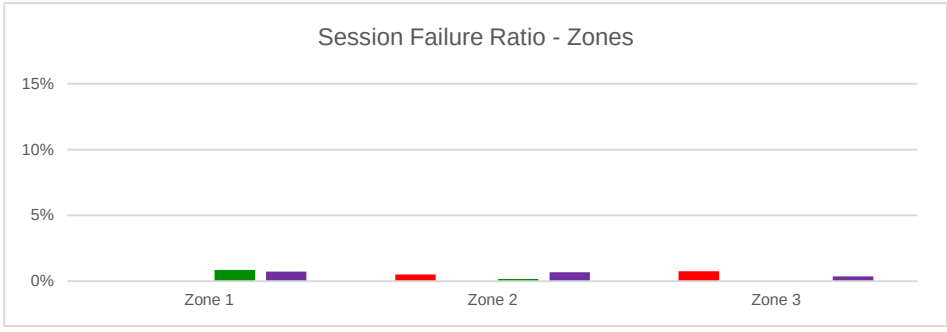
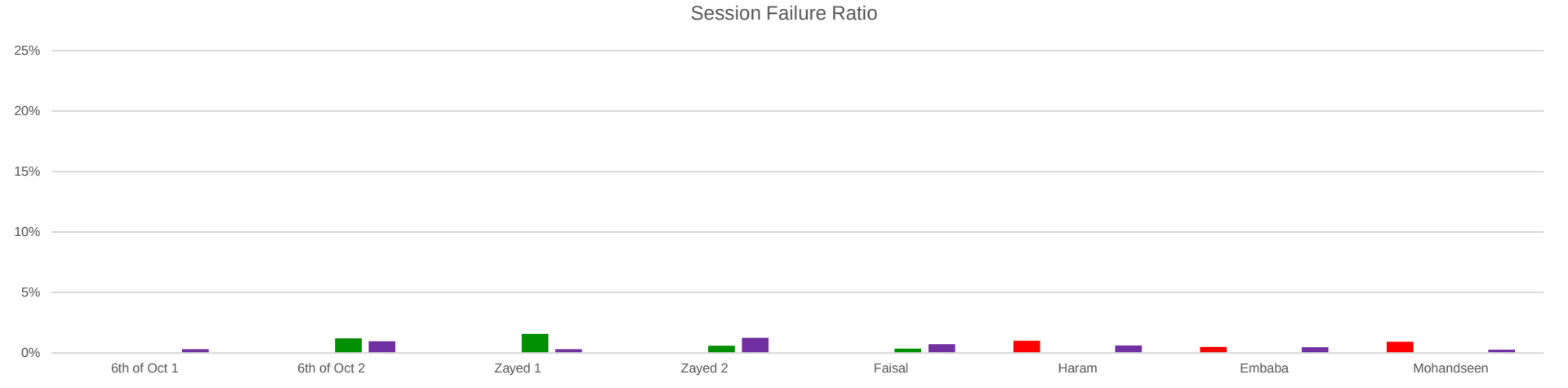
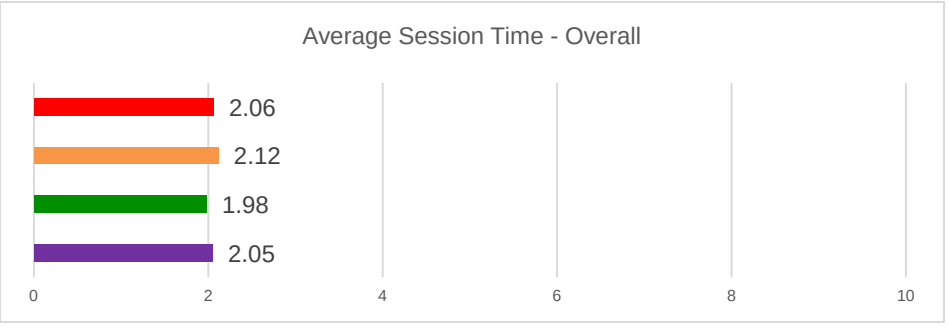
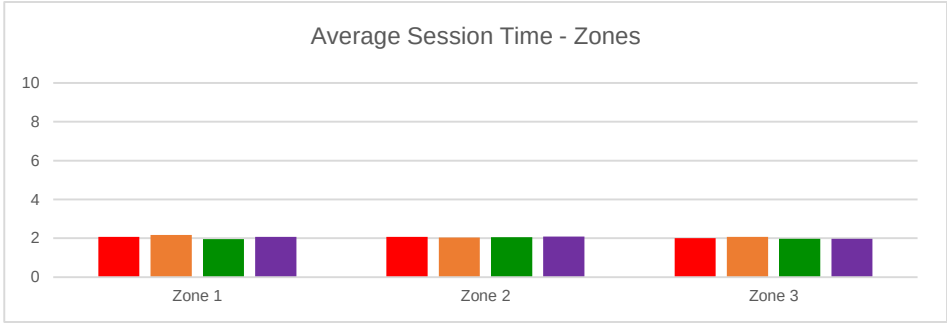


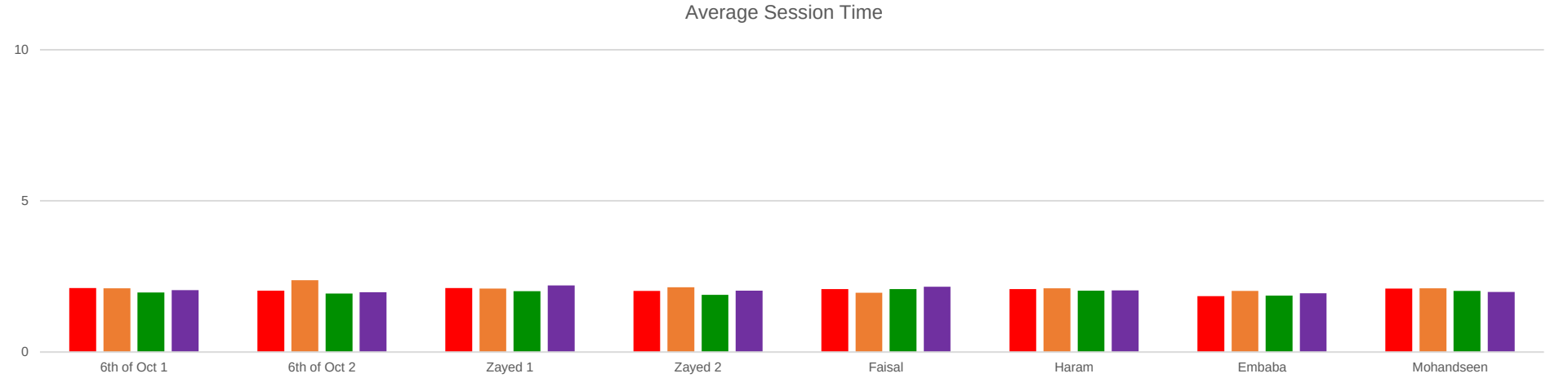




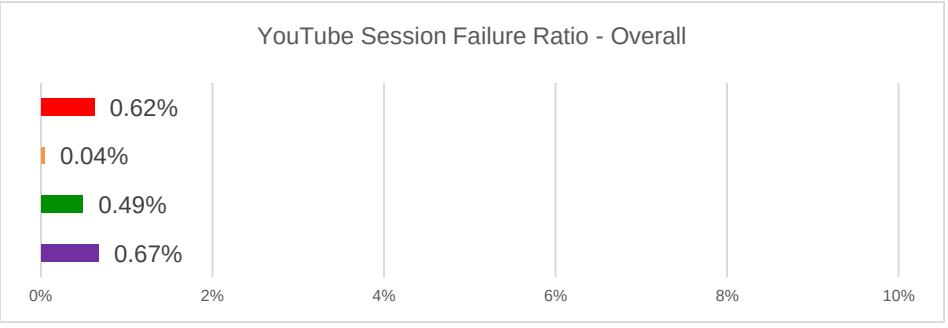
Google Session Time

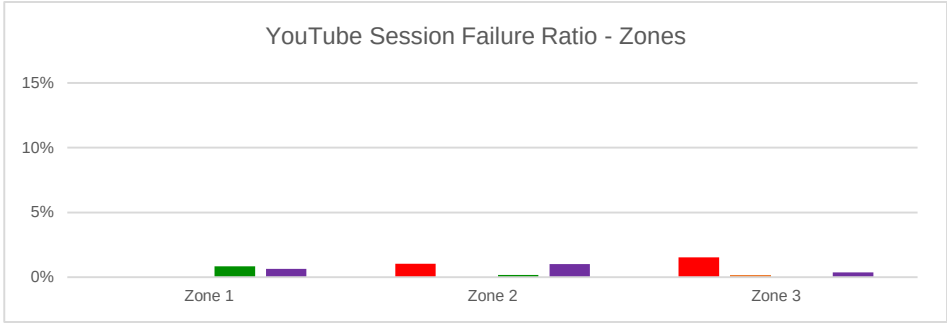


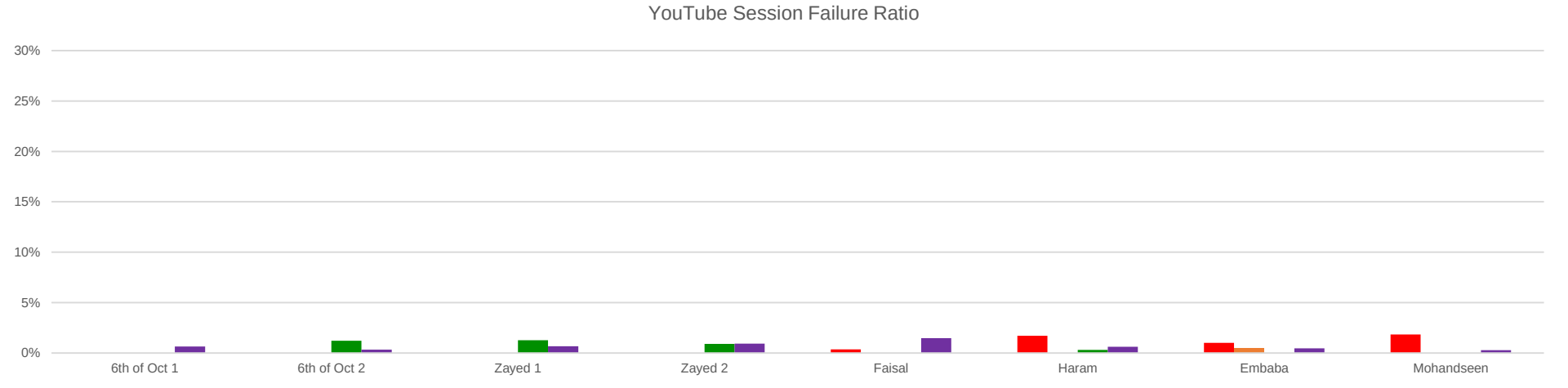




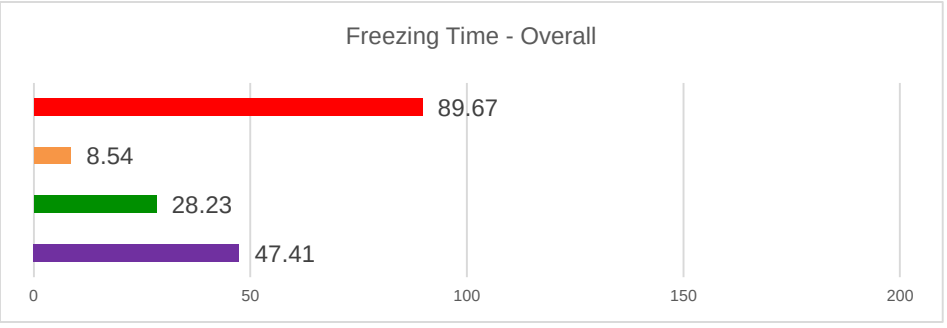
YouTube Session Failure Ratio

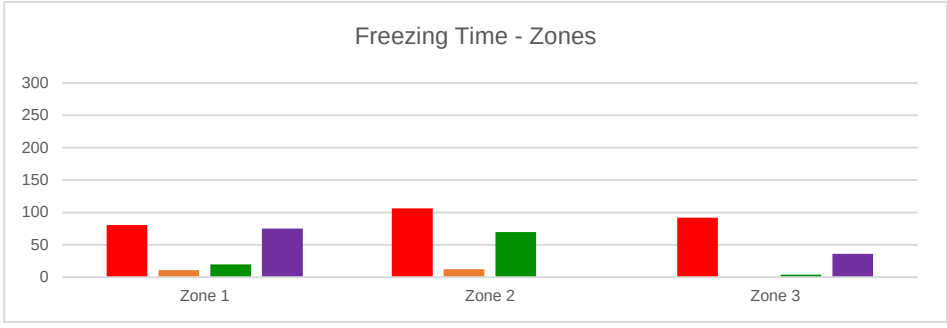


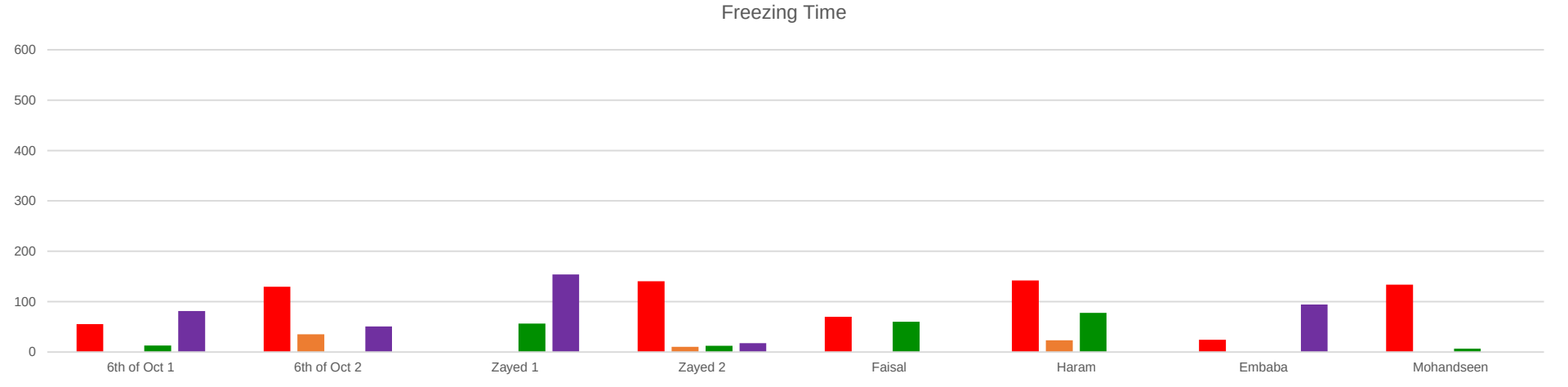




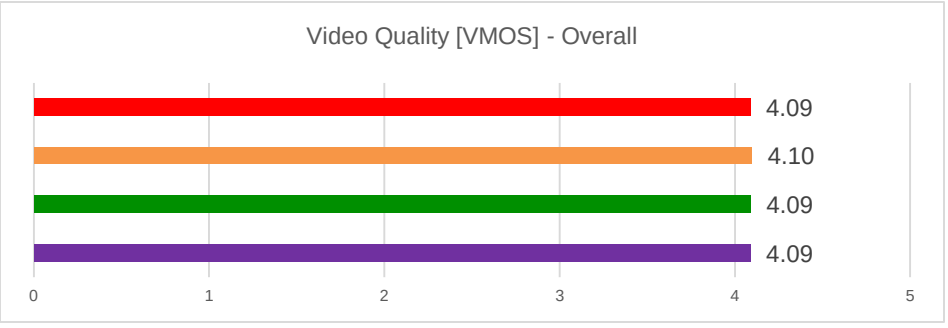
YouTube Freezing Time [msec]

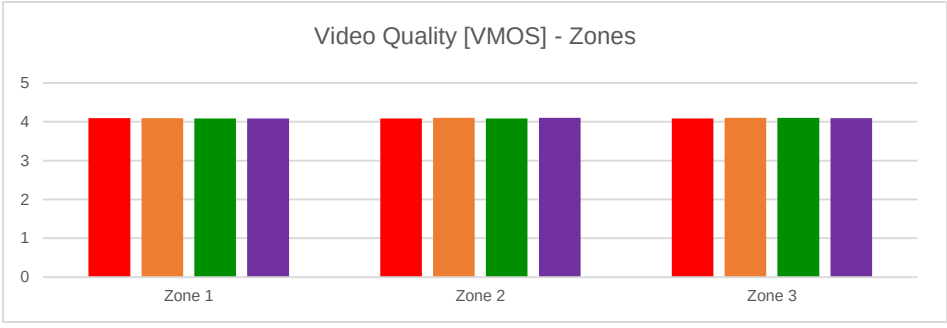


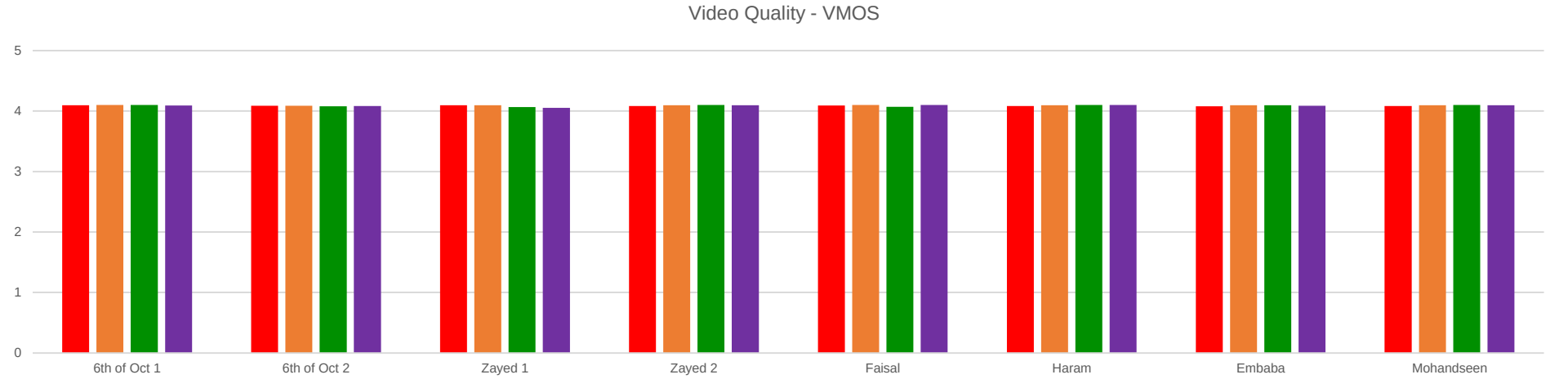




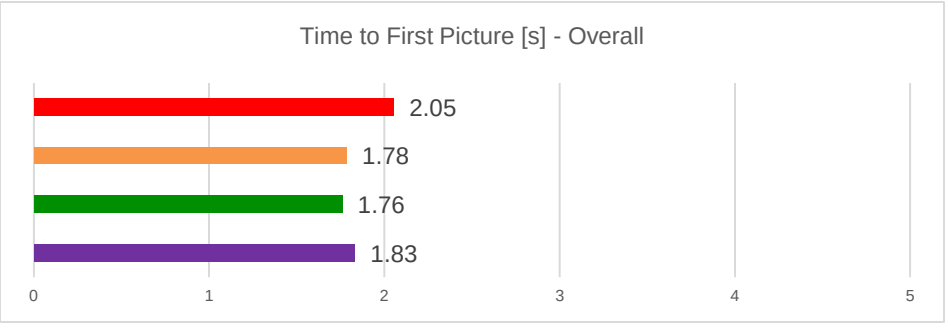
YouTube Video Quality

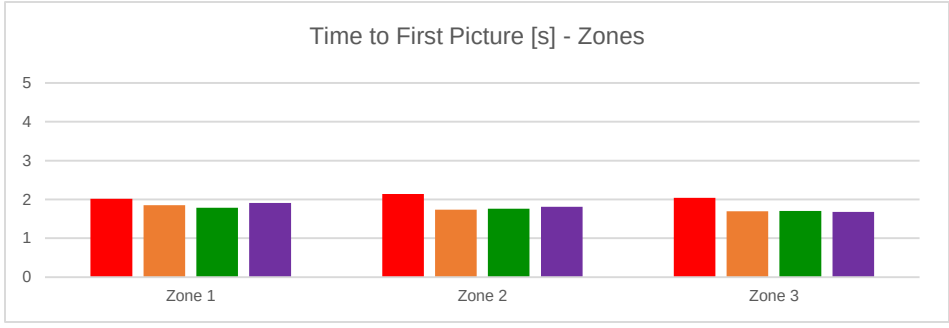


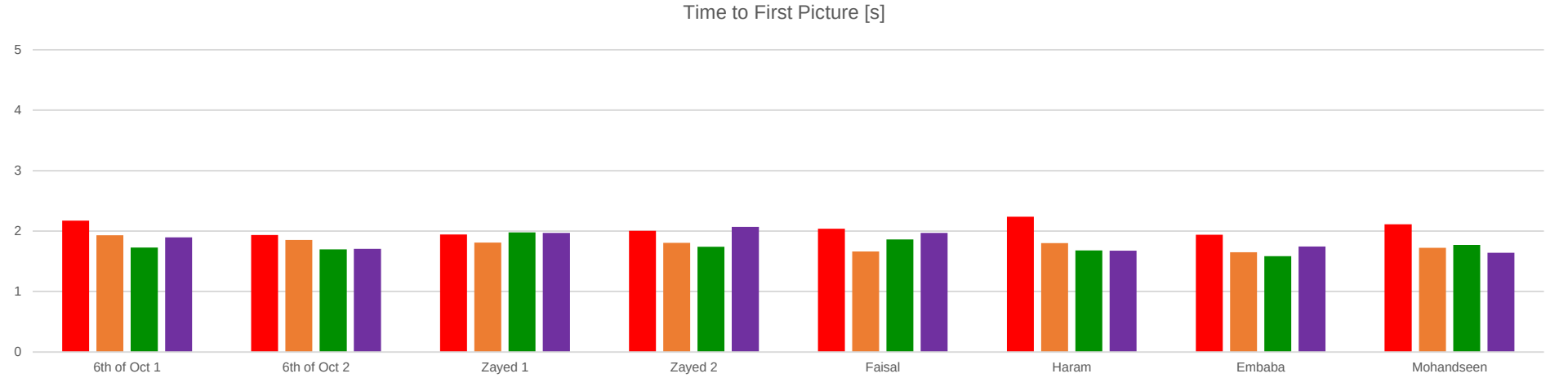




YouTube Time to 1st Picture

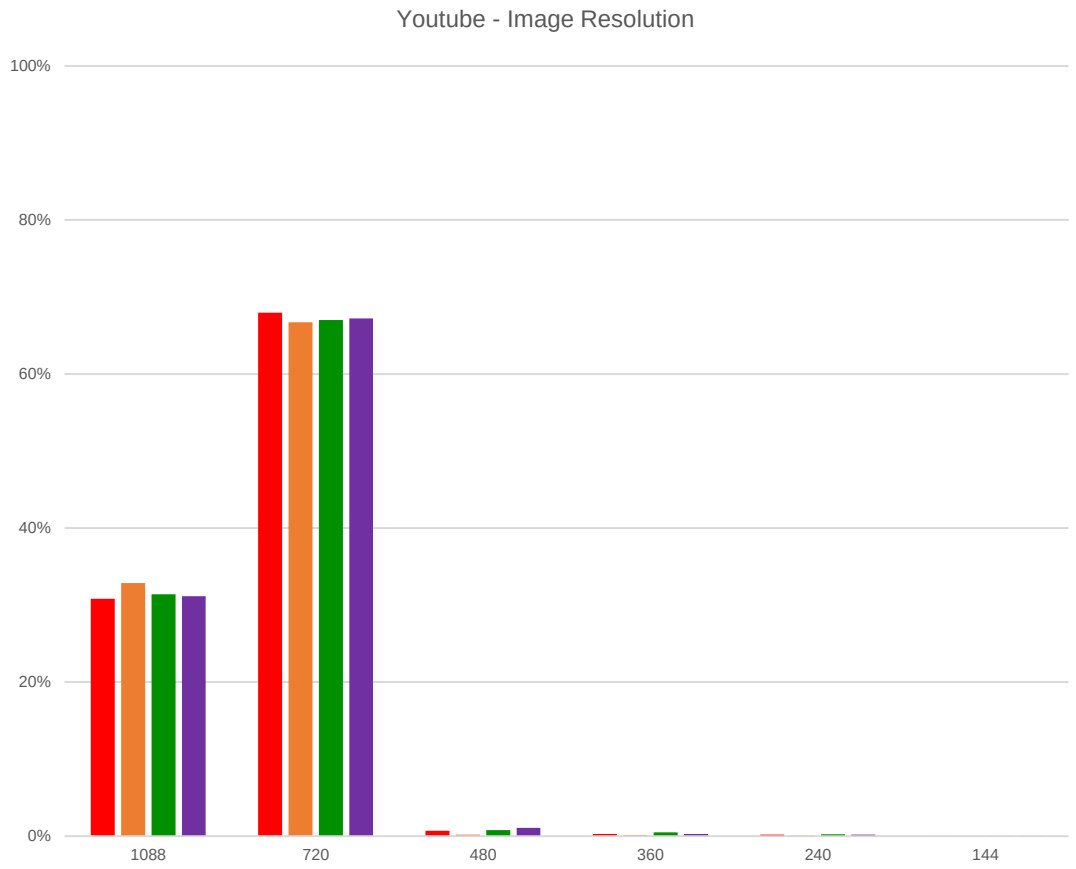






YouTube

Image Resolution



Agenda

1. *Quantitative Information*
2. *Voice Service Quality & Performance - Cairo*
3. *Data Service Quality & Performance – Cairo*
4. *Voice Service Quality & Performance - Giza*
5. *Data Service Quality & Performance – Giza*
6. ***Voice Service Quality & Performance - Alexandria***
7. *Data Service Quality & Performance - Alexandria*
8. *Voice Service Quality & Performance - Delta*
9. *Data Service Quality & Performance – Delta*
10. *Voice Service Quality & Performance – Upper Egypt*
11. *Data Service Quality & Performance – Upper Egypt*
12. *Annexes*

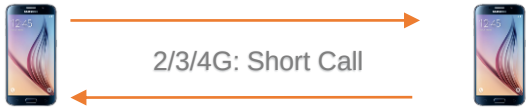
Zones Definition

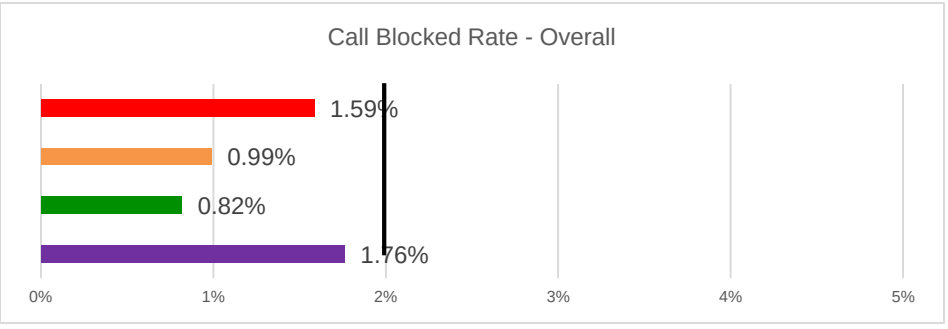
Alexandria

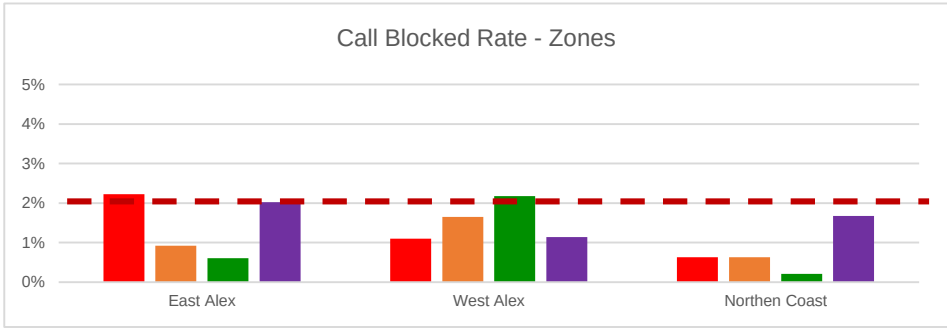
Alex Z1	East1 East2 East3 East4 East5
Alex Z2	West 1 West 2
Alex Z3	Matrouh Northencoast

Voice Service KPI’s

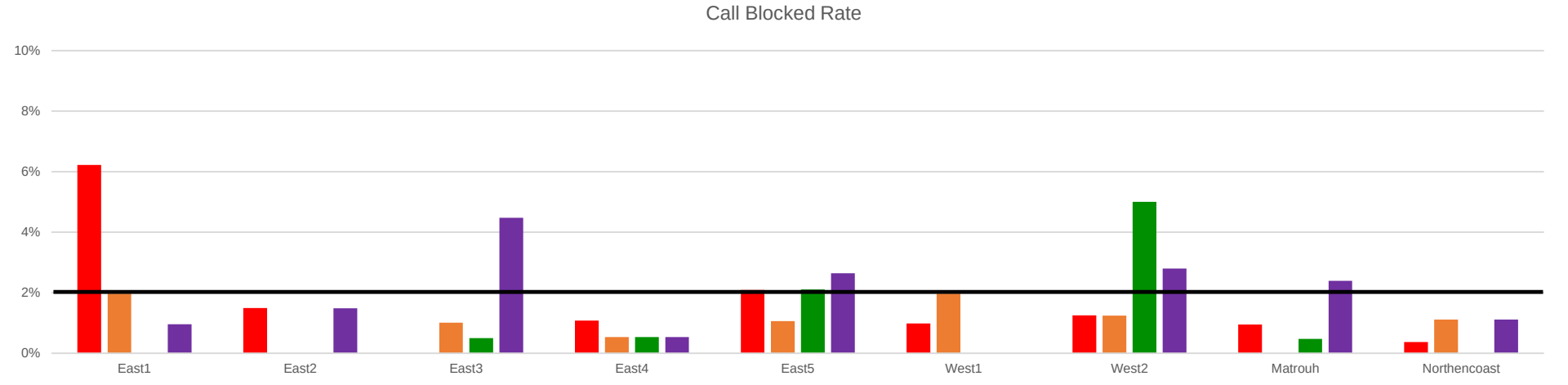
Accessibility: Call Blocked Rate



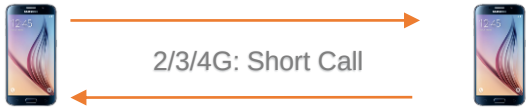


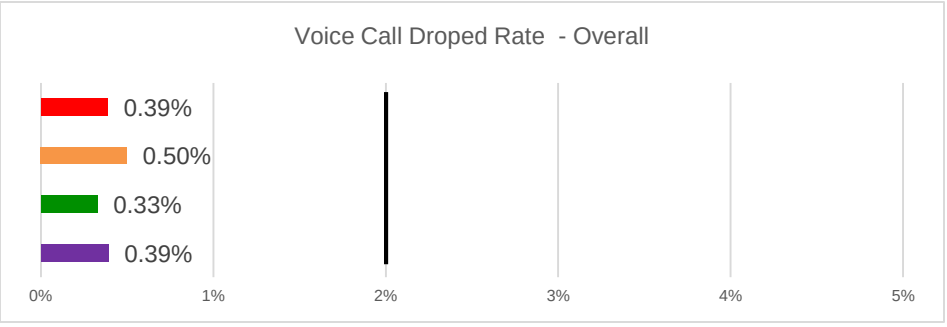


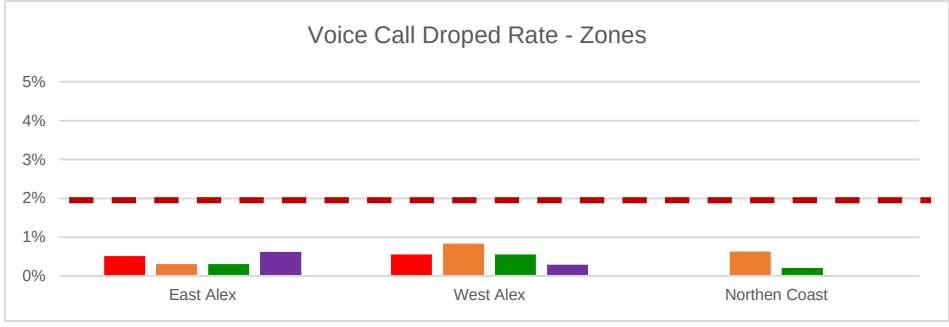
Call Blocked Rate *represents the ratio between unsuccessful call attempts and all calls made (both successful & unsuccessful).*



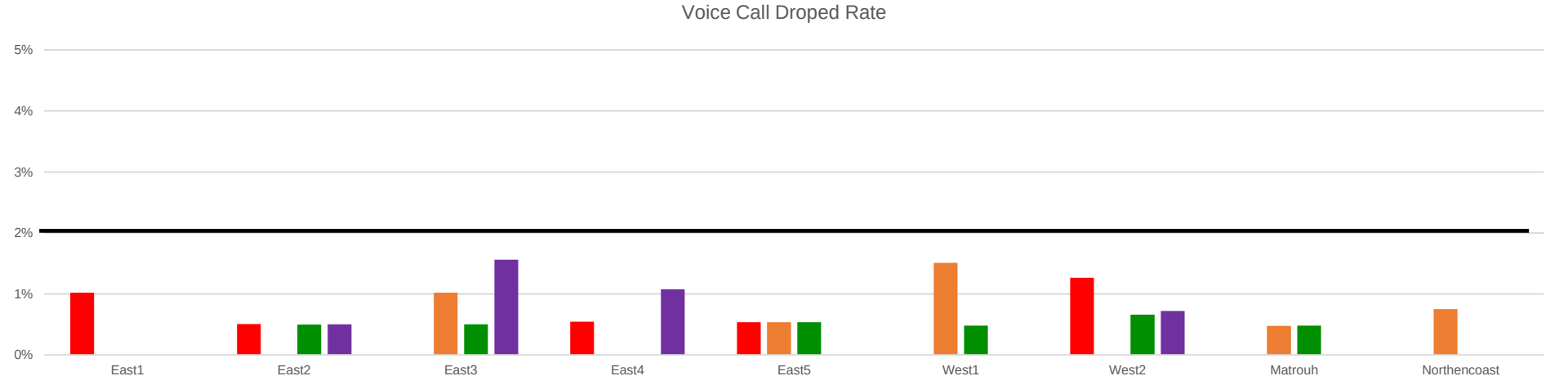
Retainability: Call Dropped Rate



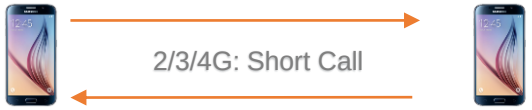


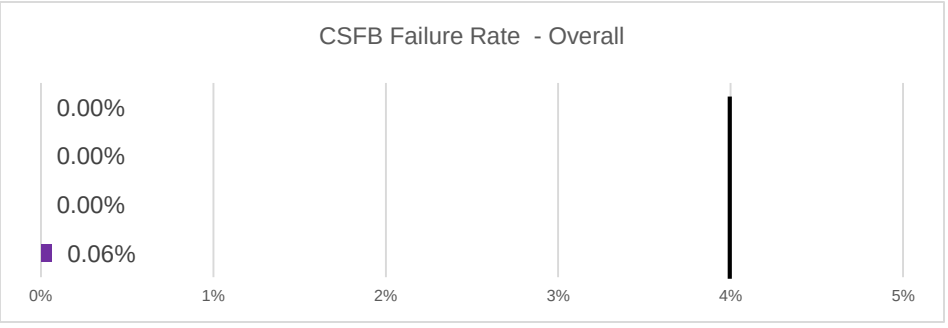


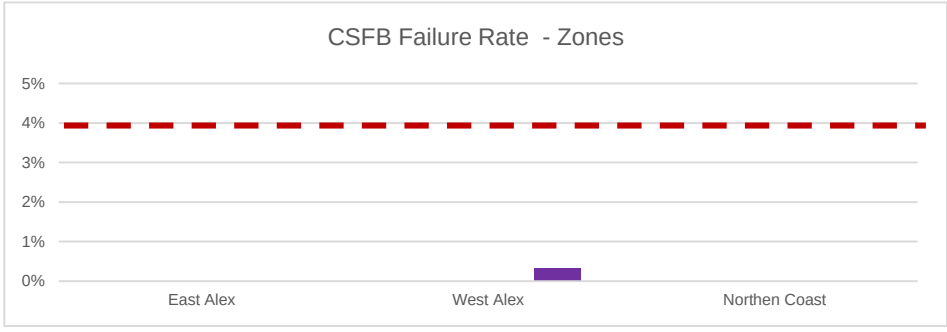
Voice Call Retainability *is represented by call drop rates.*



Accessibility: CSFB Failure Rate [%]

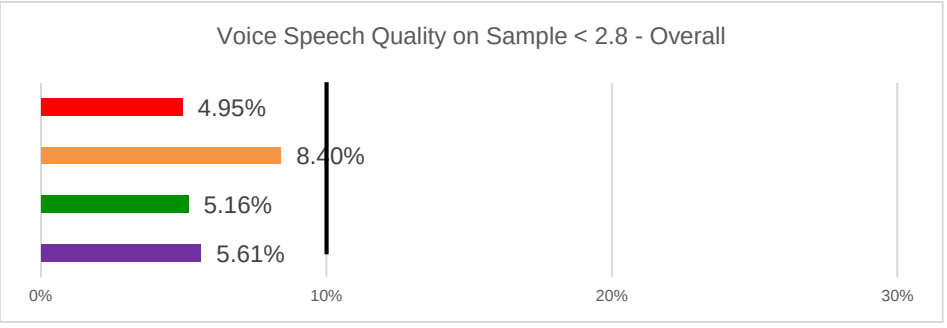


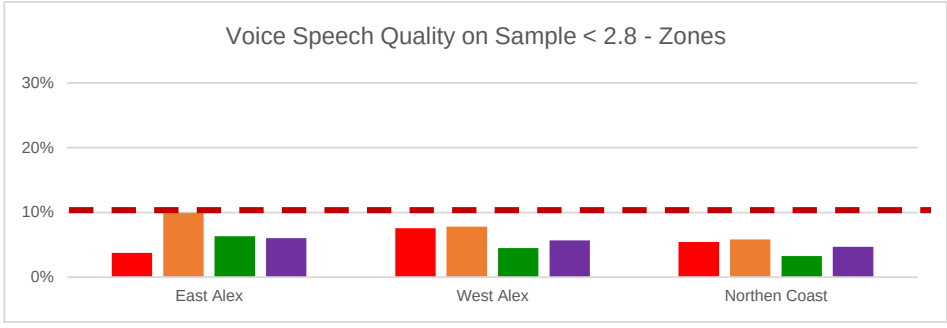




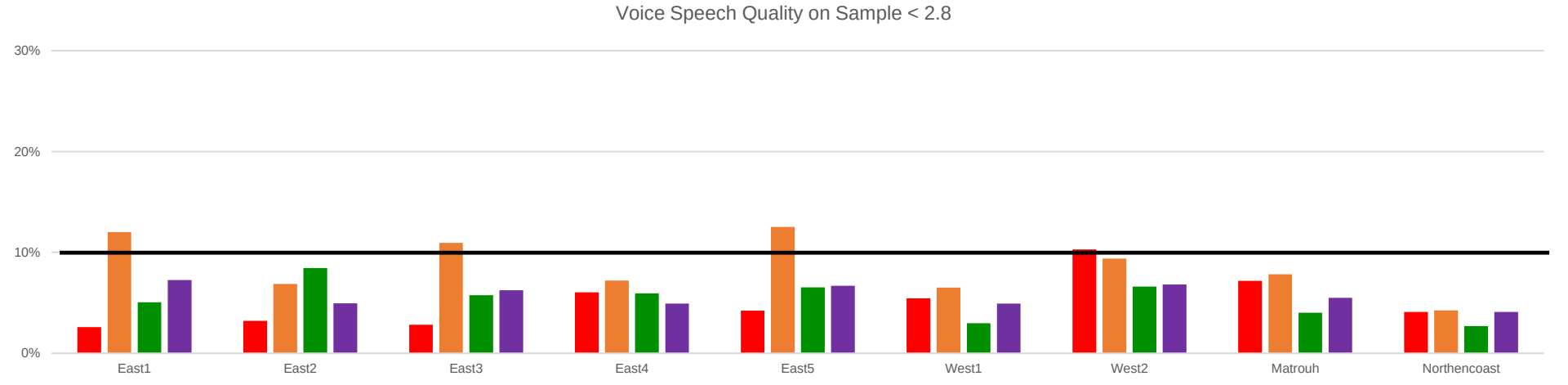
CSFB Failure Rate *represents the ratio between unsuccessful fall back attempt to lower technology than 4G (LTE) and all calls made (both successful & unsuccessful). When there is 4G (LTE) present before starting the session.*

Speech Quality: MOS Voice Speech Quality < 2.8

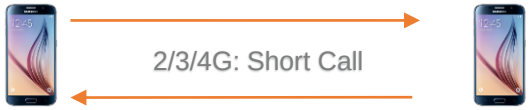


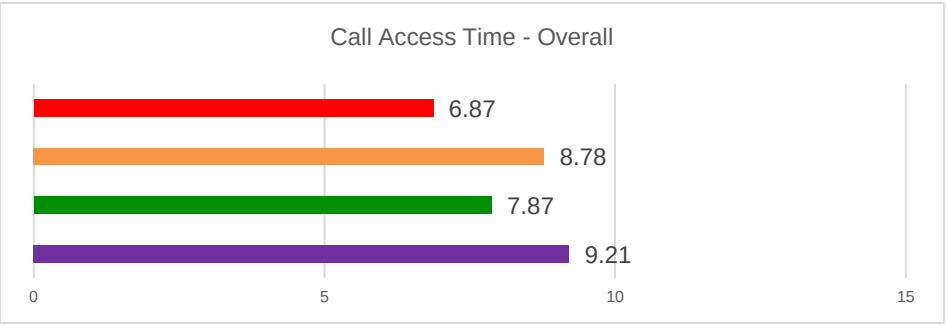


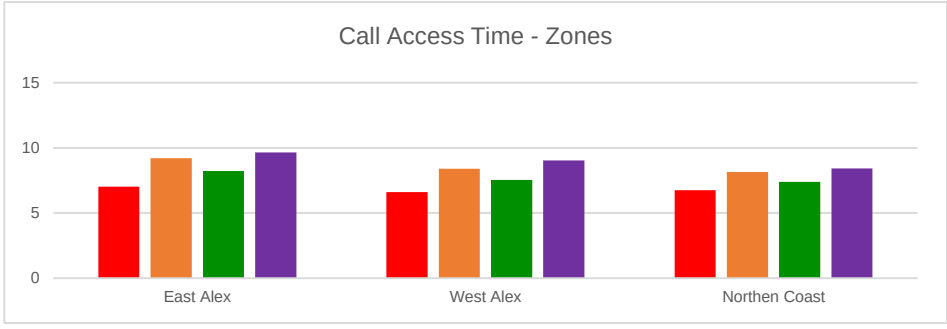
MOS Voice Speech Quality < 2.8 *represents the ratio between total number of MOS samples less than 2.8 all collected MOS samples*



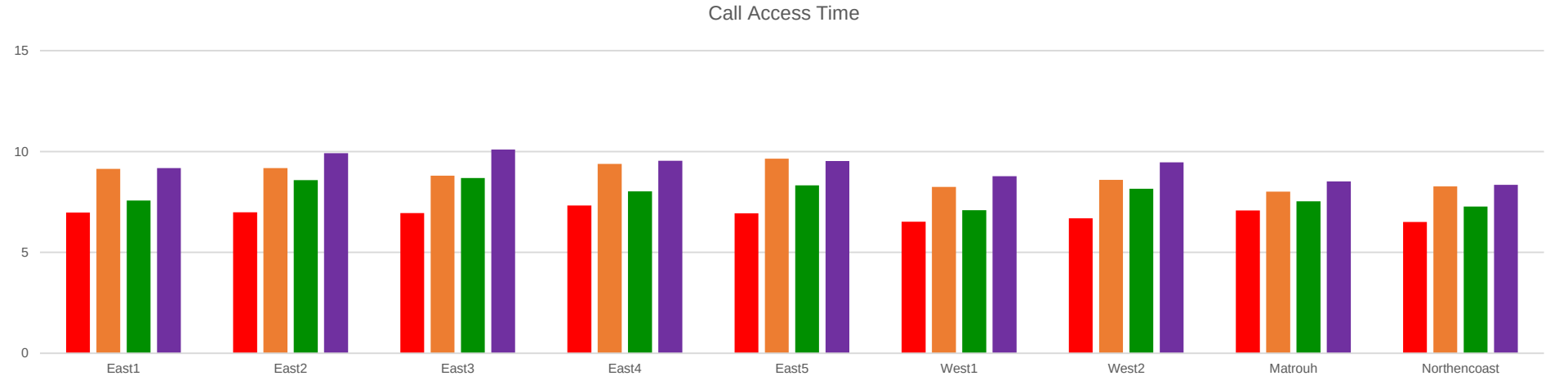
Accessibility: Call Access Time [sec.]



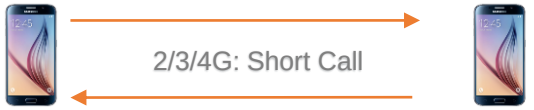


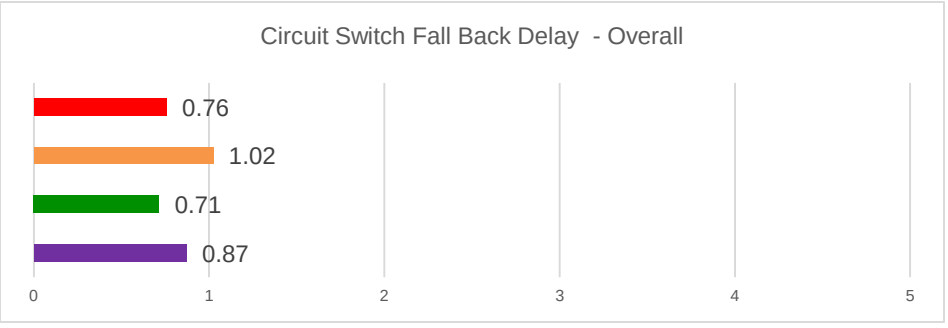


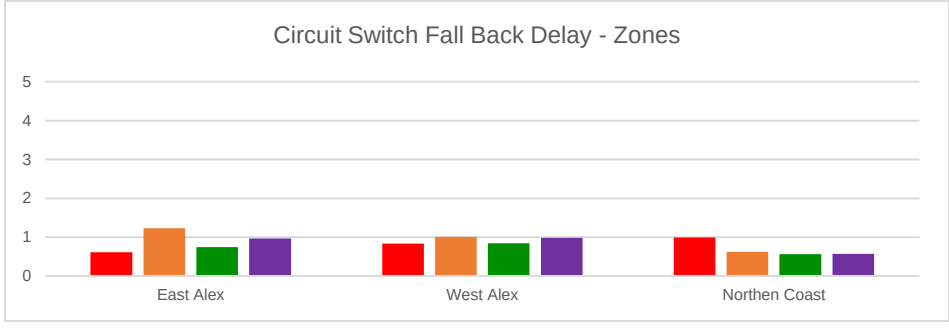
Call Access Time *represents the period of time elapsed from the sending of a complete destination address (target number) to the setting up of a call to the receiving terminal*.



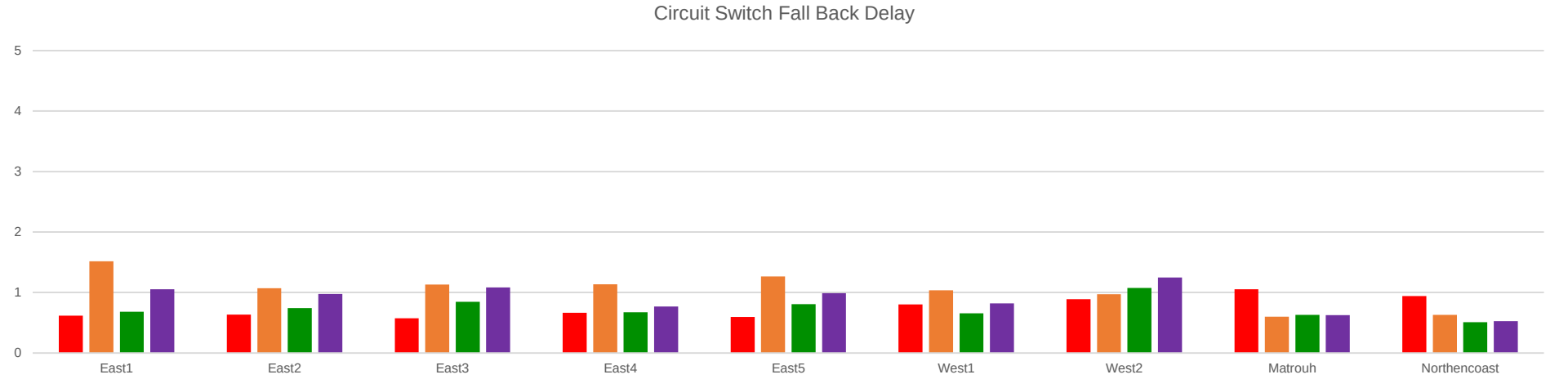
Accessibility: CSFB Delay [sec.]



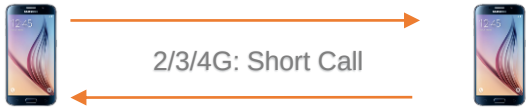


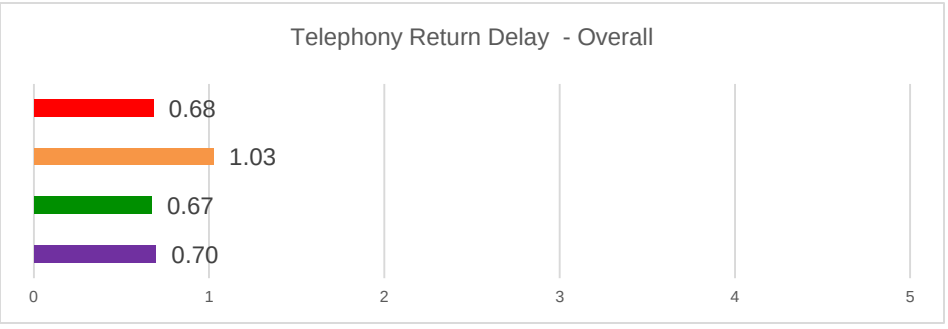


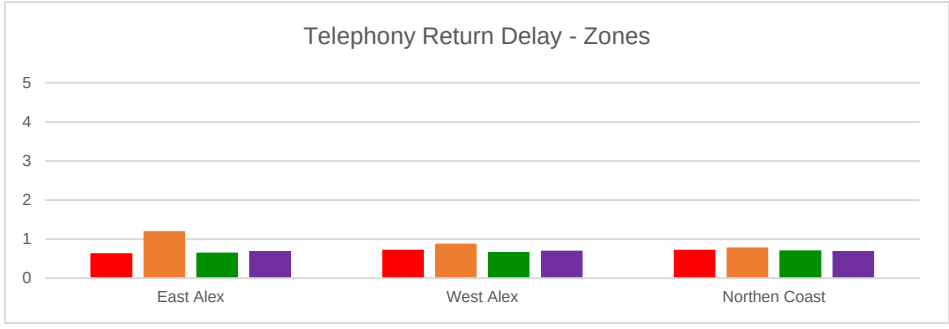
CSFB Delay *represents the period of time to overlay 3G/2G environment instead of handling calls in 4G (LTE). Depending on the CSFB strategy.*



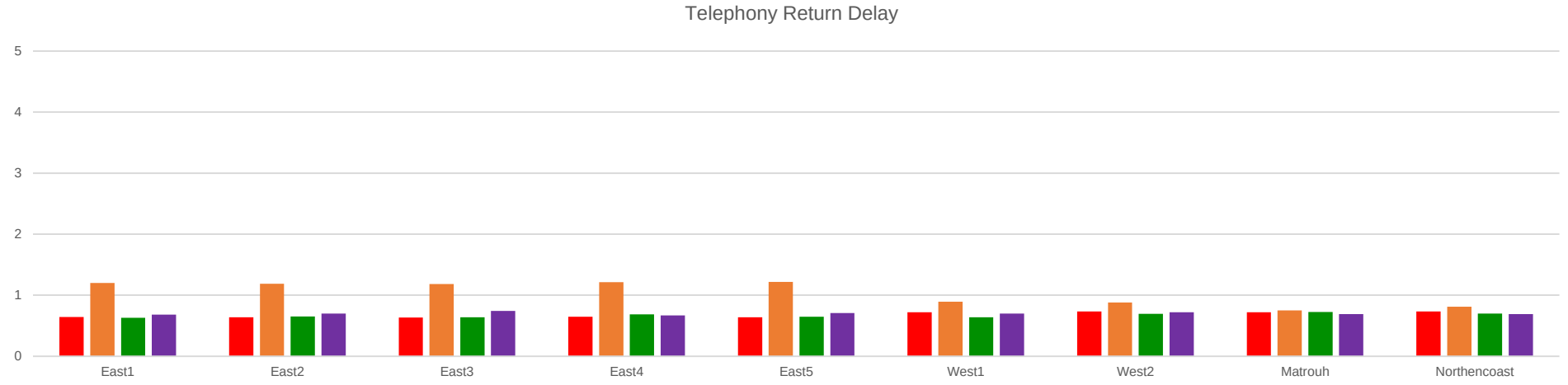
Accessibility: Telephony Return Delay [sec.]





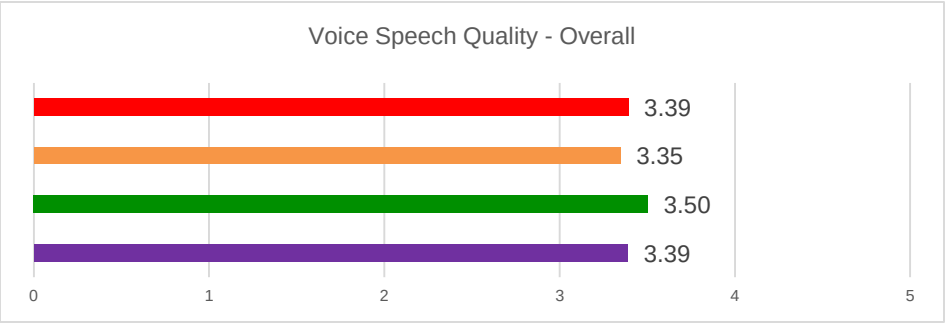


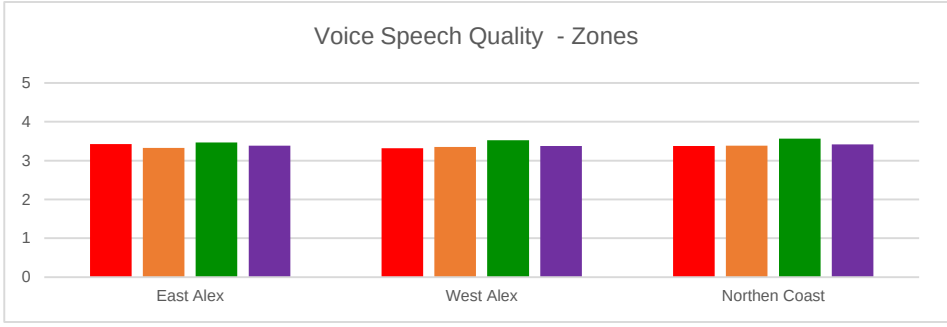
Telephony Return Delay *measures the time that a UE uses to re-join the LTE (4G) network after call end*

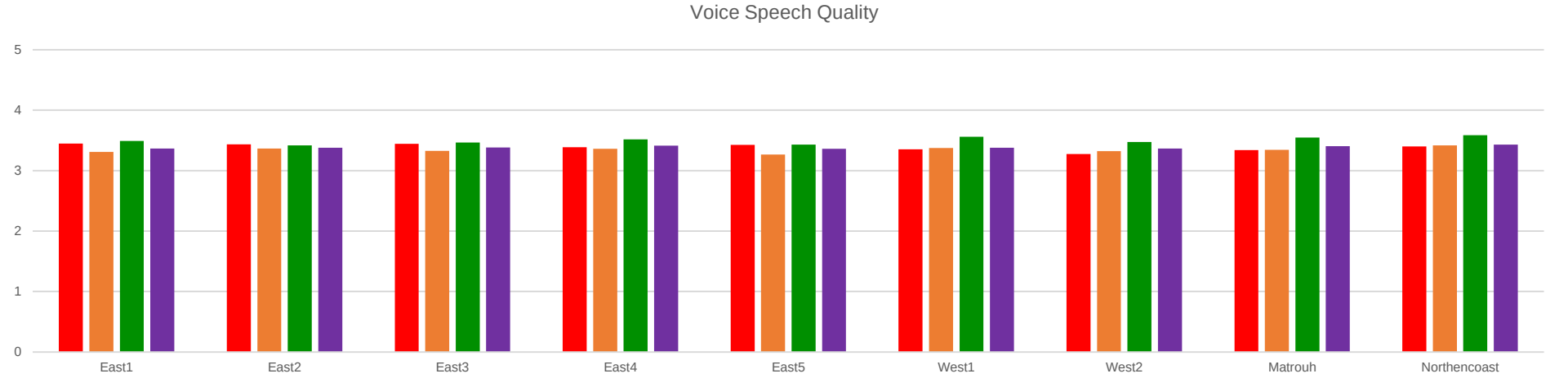


Voice Speech Quality KPI’s

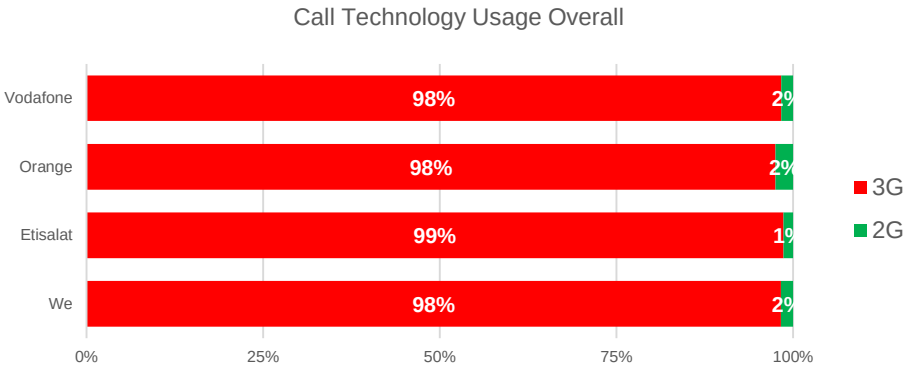
Speech Quality: MOS Scores





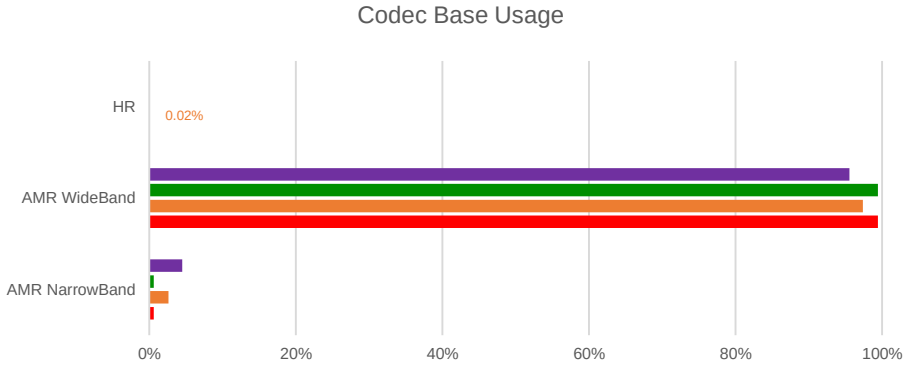


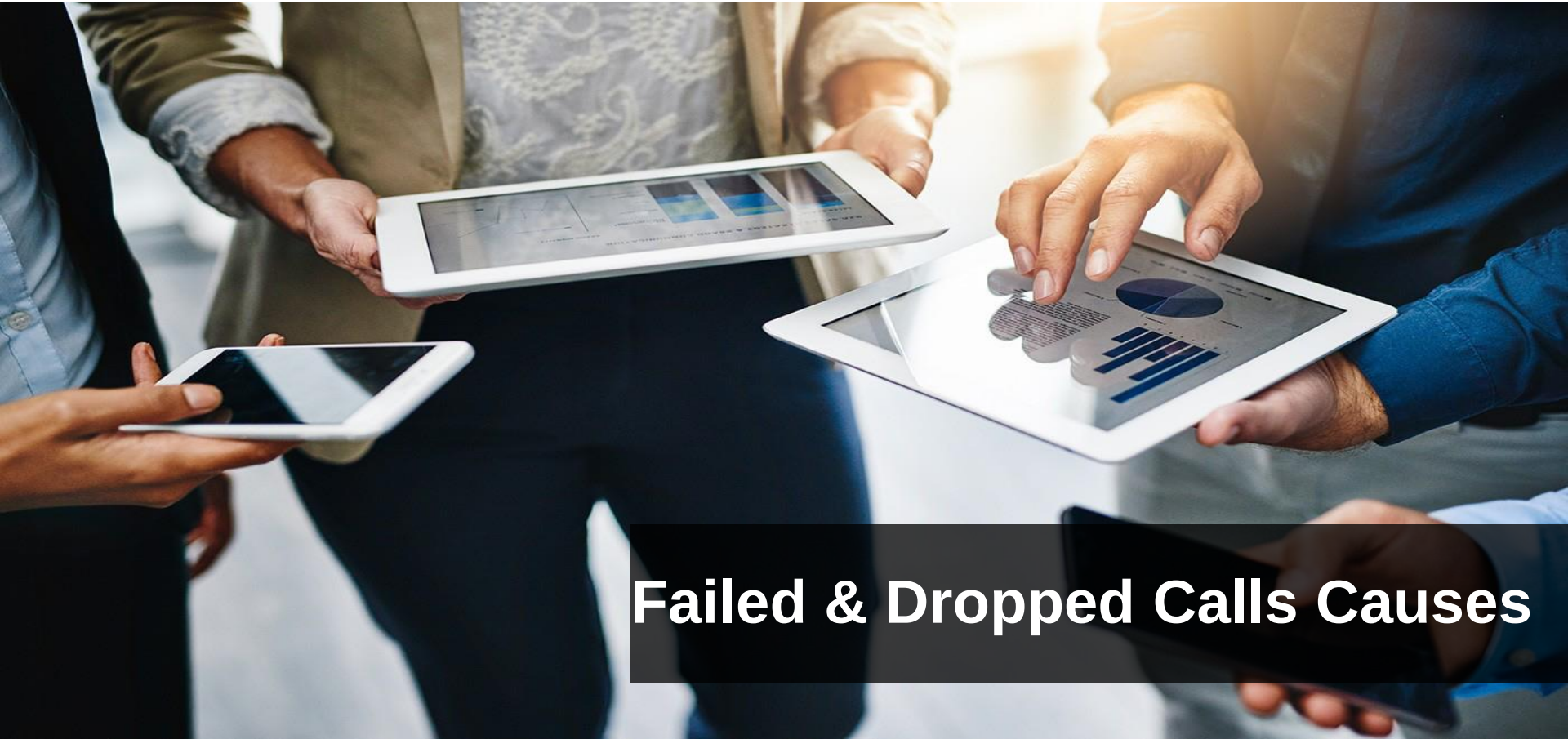
Speech Quality: Call technology Usage & Codec Base Usage



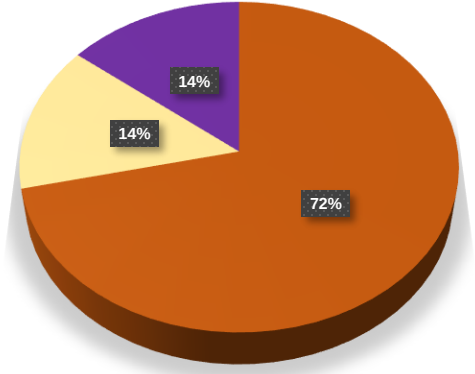
Call technology Usage *represents the call technology used over call period. The more calls on 3G (UMTS) the better MOS served.*

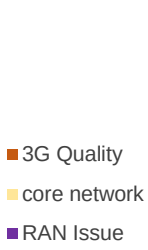
Codec Base Usage *represents the codec used over the call where AMR wideband (AMR WB) leads to better voice quality experience by the end user than the AMR Narrowband (AMR NB)*

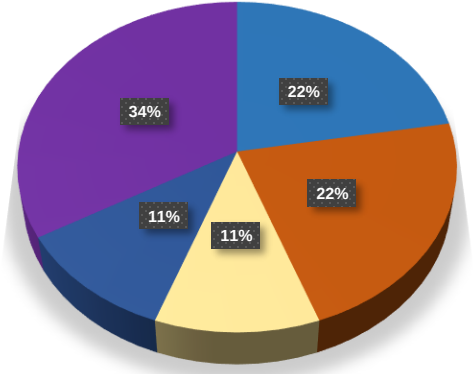


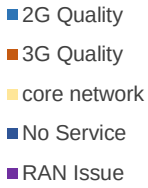

Failed & Dropped Calls Causes

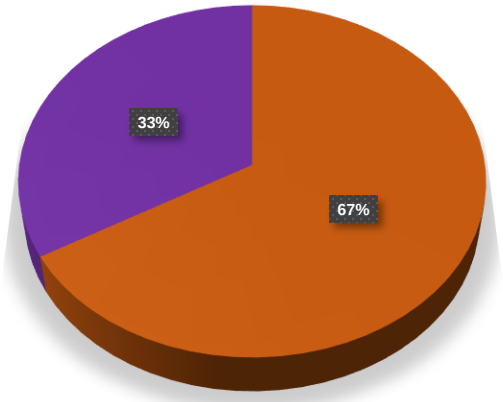
Analysis: Dropped Calls Causes

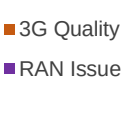


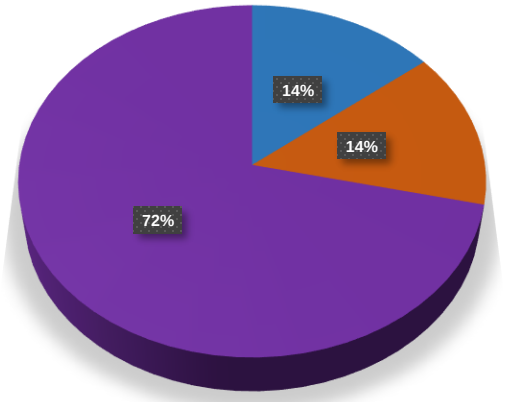


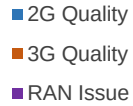












All Operators: Dropped Calls Locations 1/2

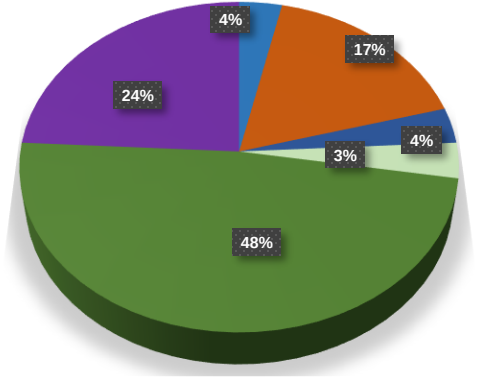
vodafone

orange

All Operators: Dropped Calls Locations 2/2

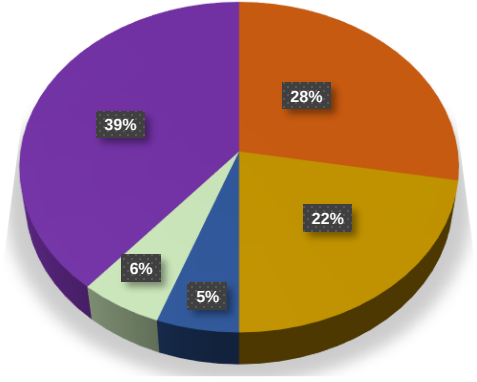
Analysis: Failed Calls Causes

vodafone



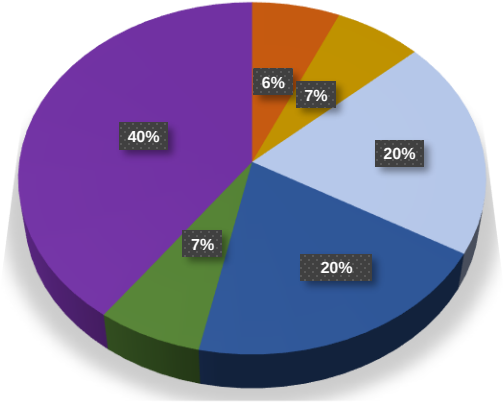
2G Quality
3G Quality
No Service
Other
paging Issue
RAN Issue

orange



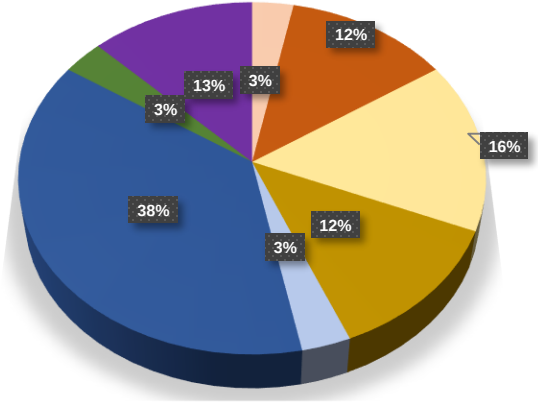
3G Quality
CSFB Issue
No Service
Other
RAN Issue

etisalat



3G Quality
CSFB Issue
Mobility Issue
No Service
paging Issue
RAN Issue

we



3G Coverage
3G Quality
core network
CSFB Issue
Mobility Issue
No Service
paging Issue
RAN Issue

All Operators: Blocked Calls Locations 1/2

vodafone

orange

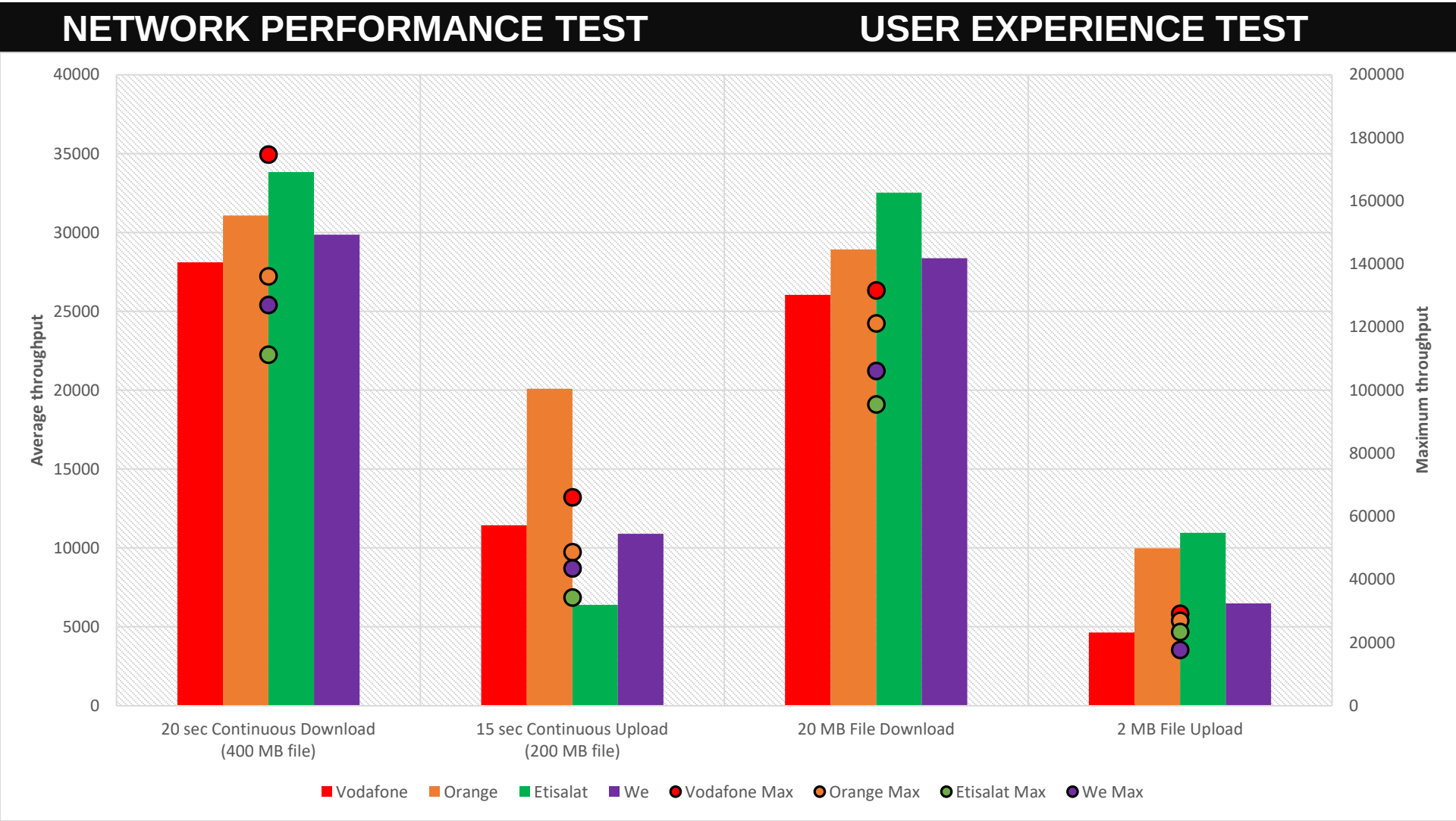
All Operators: Blocked Calls Locations 2/2

Agenda

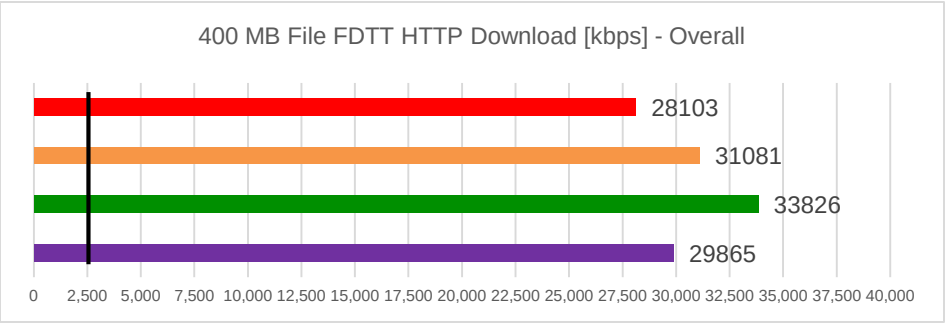
1. *Quantitative Information*
2. *Voice Service Quality & Performance - Cairo*
3. *Data Service Quality & Performance – Cairo*
4. *Voice Service Quality & Performance - Giza*
5. *Data Service Quality & Performance – Giza*
6. *Voice Service Quality & Performance - Alexandria*
7. ***Data Service Quality & Performance - Alexandria***
8. *Voice Service Quality & Performance - Delta*
9. *Data Service Quality & Performance – Delta*
10. *Voice Service Quality & Performance – Upper Egypt*
11. *Data Service Quality & Performance – Upper Egypt*
12. *Annexes*

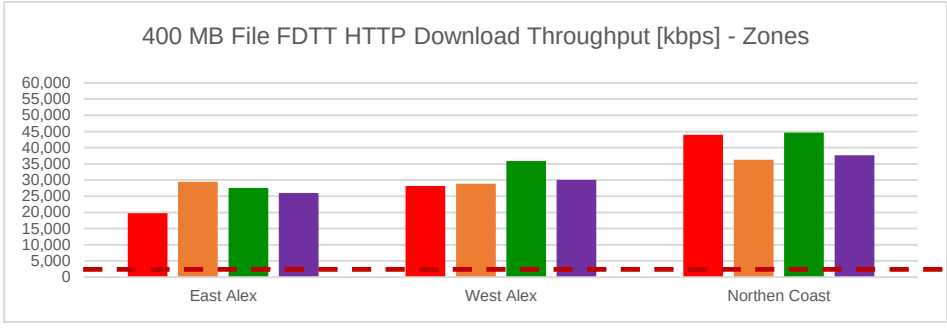
Data Service KPI’s

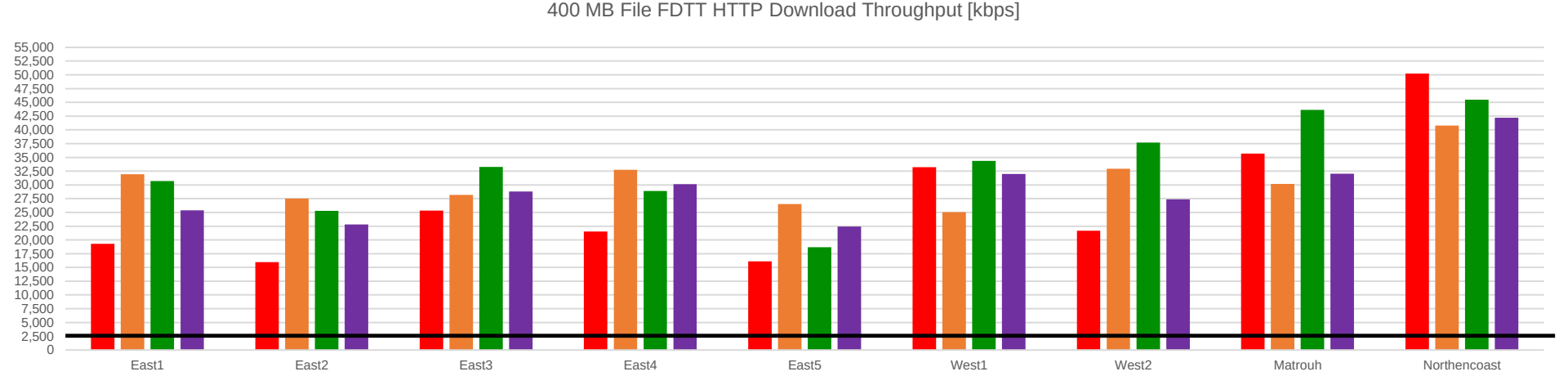
Free Mode Throughput Per Test Type



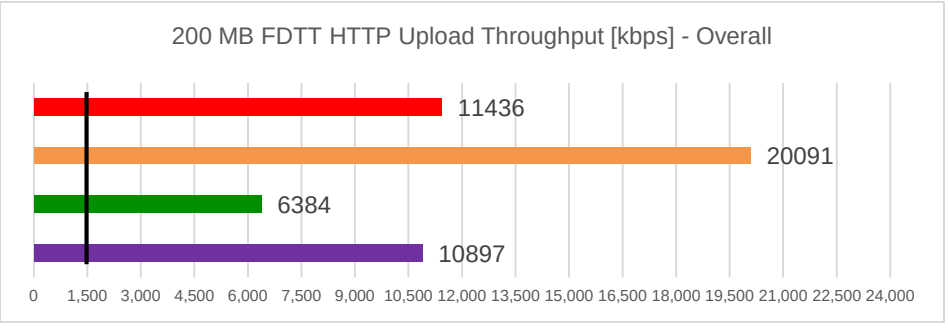
FDTT HTTP Download Transfer Throughput – Network Performance

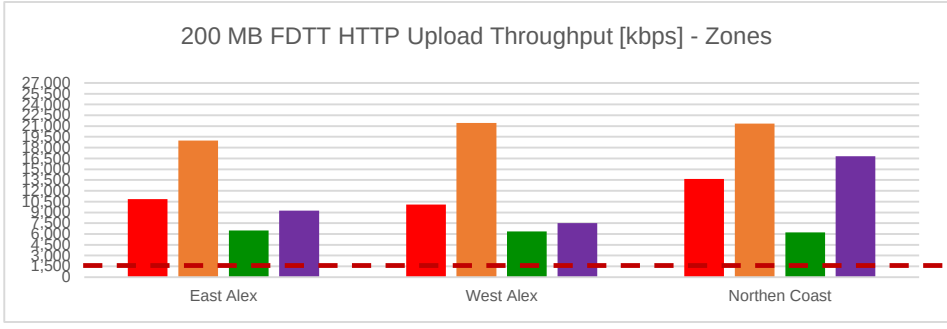


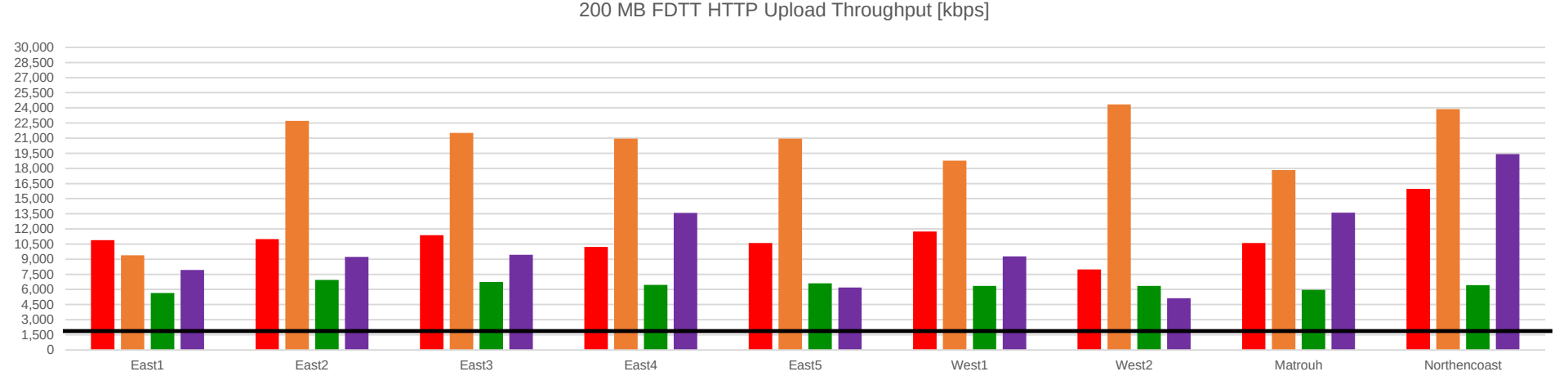




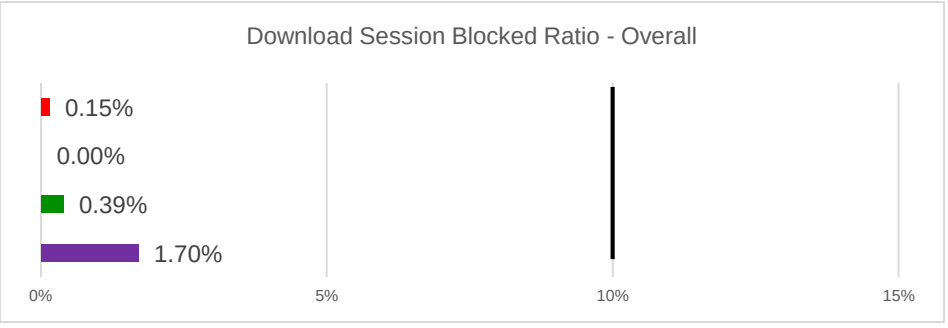
FDTT HTTP Upload Transfer Throughput – Network Performance

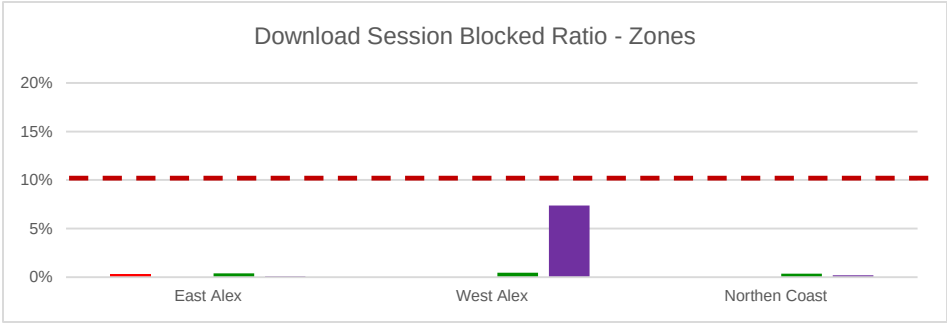


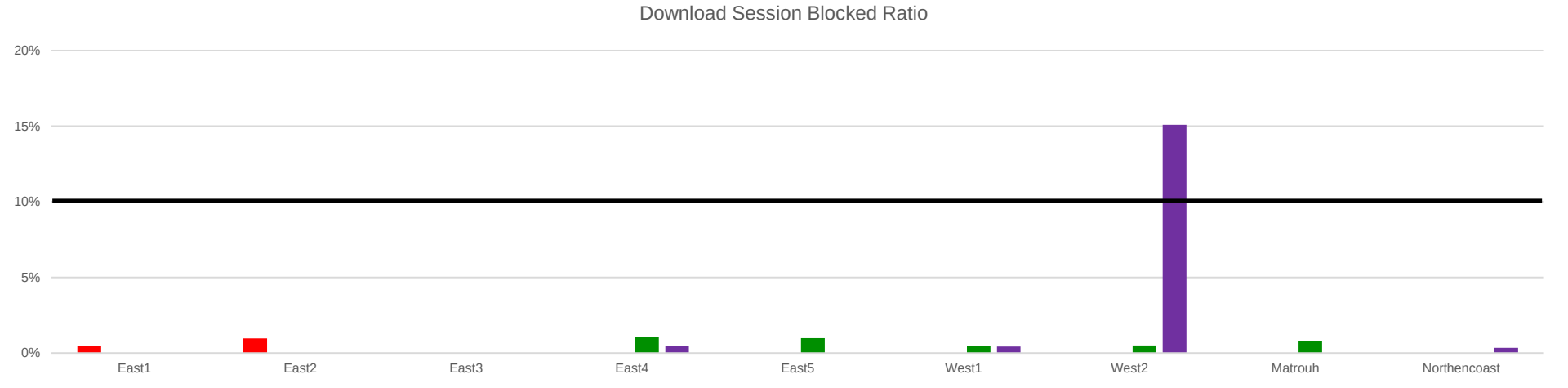




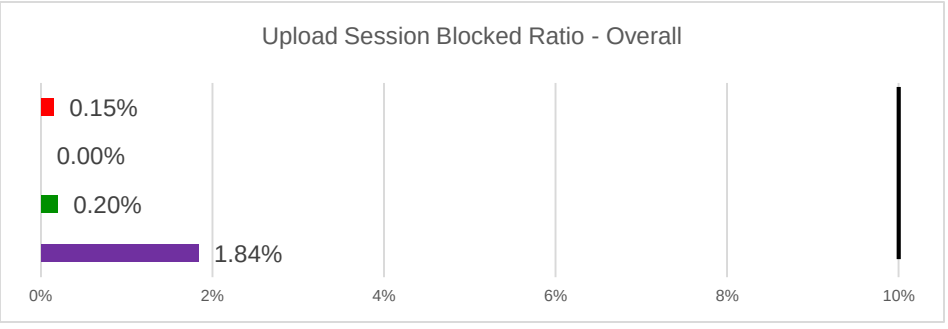
HTTP Download Session Blocked Rates

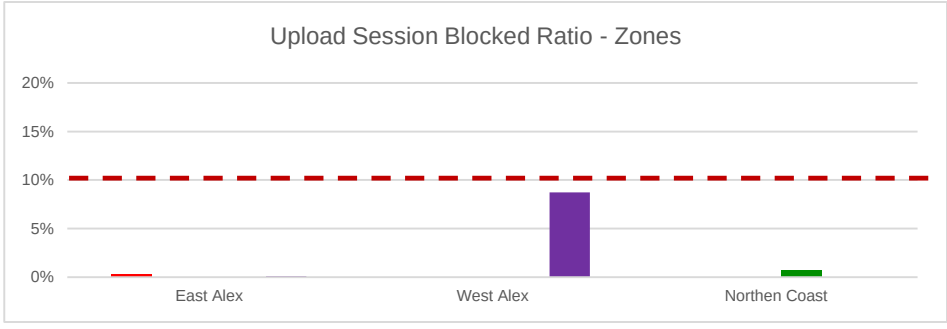


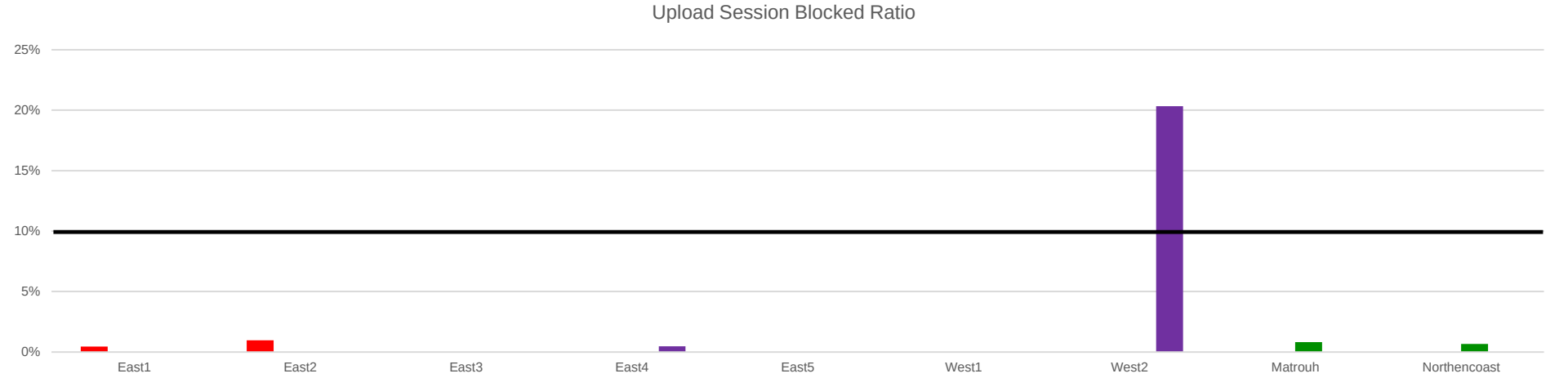




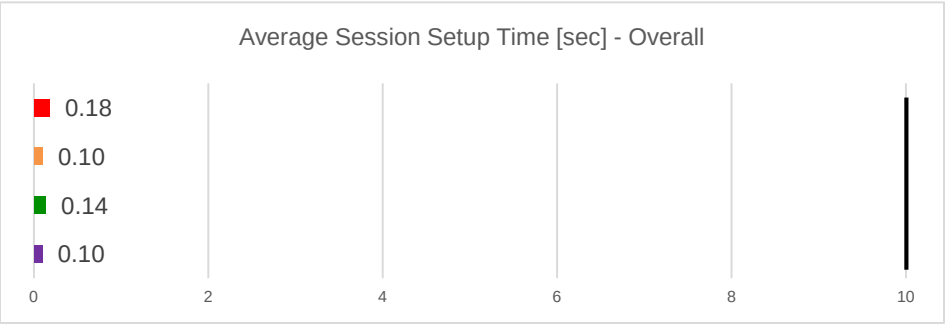
HTTP Upload Session Blocked Rates

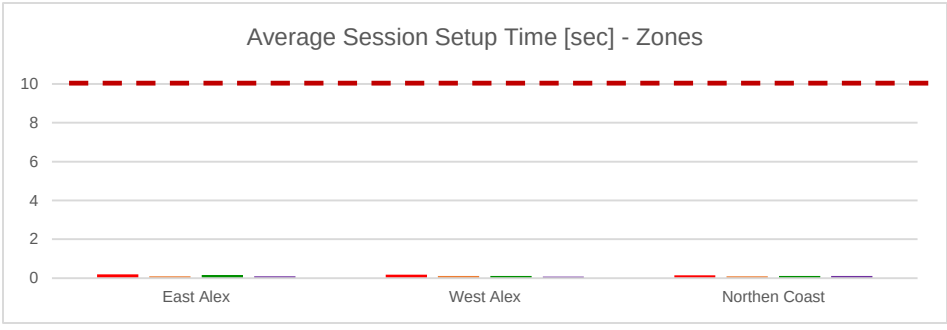


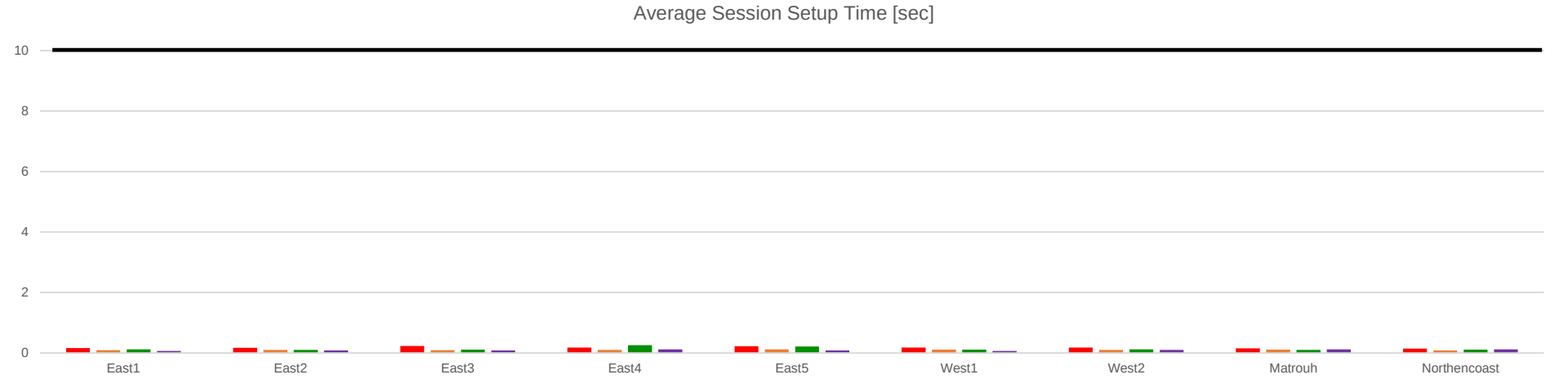




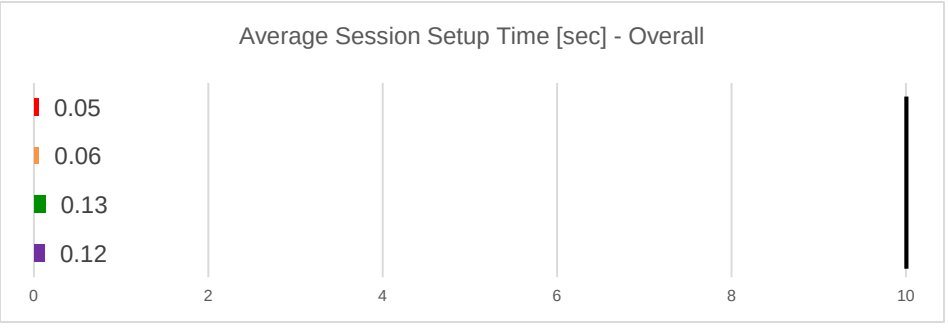
HTTP Download Average Session Setup Time

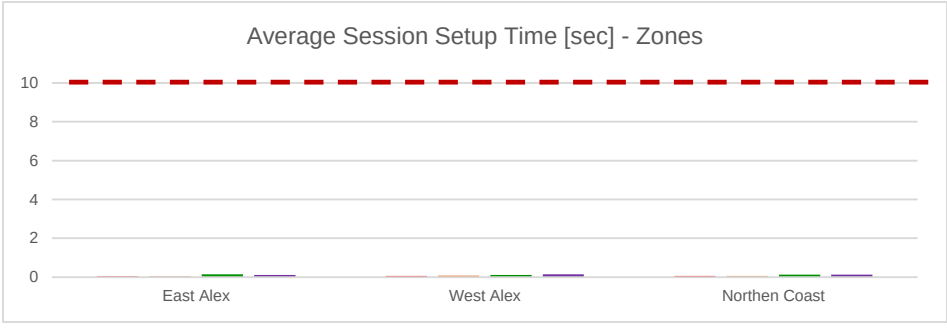


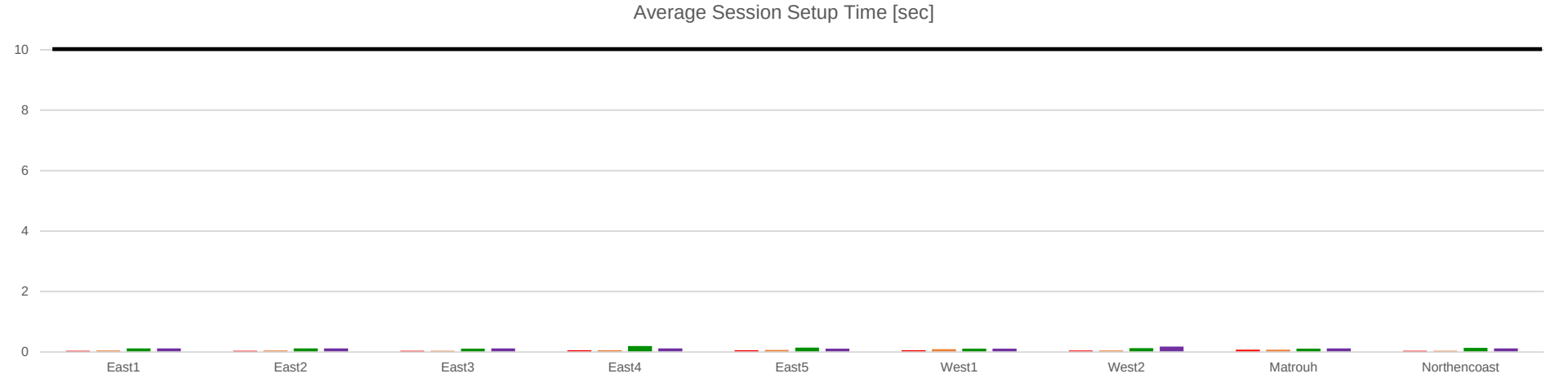


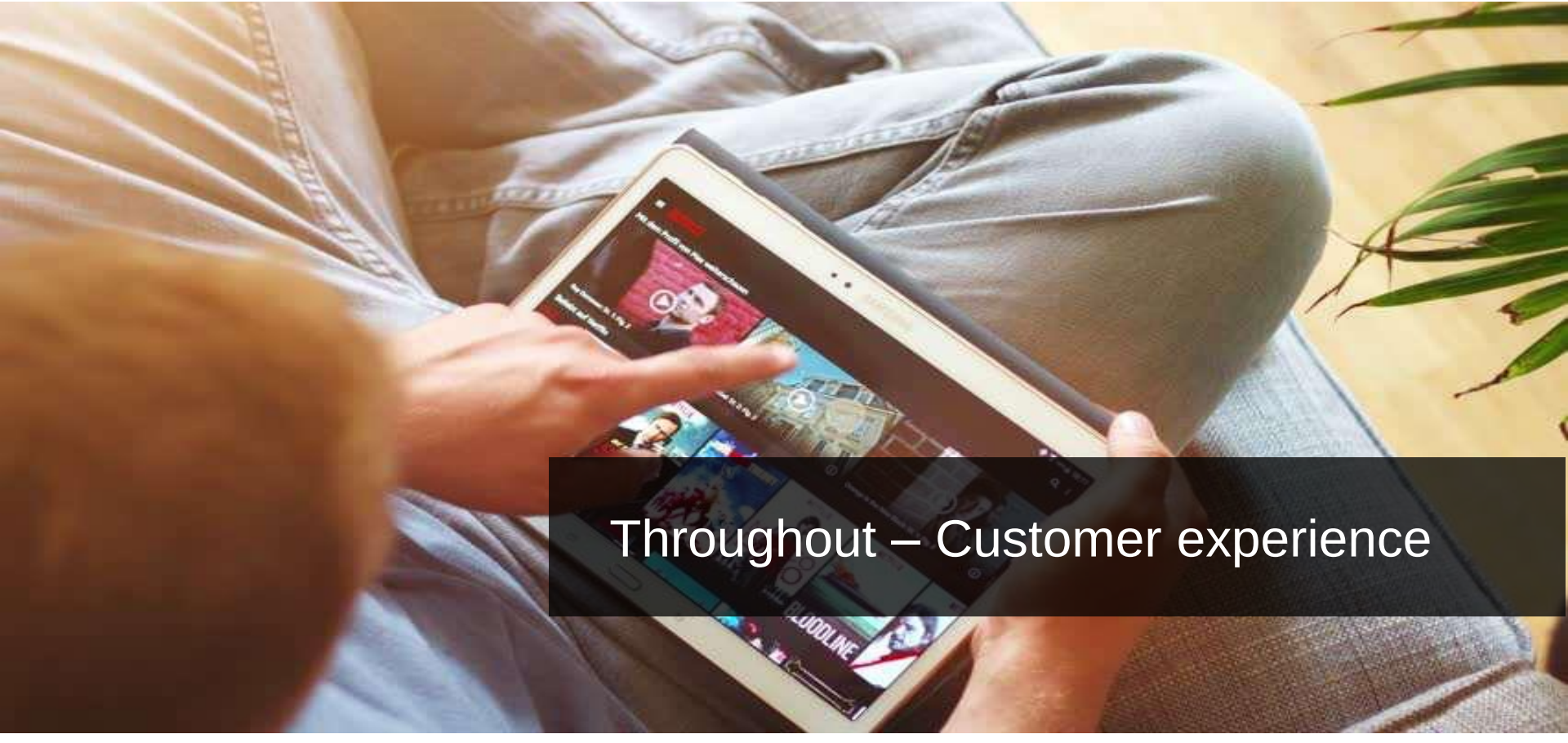


HTTP Upload Average Session Setup Time



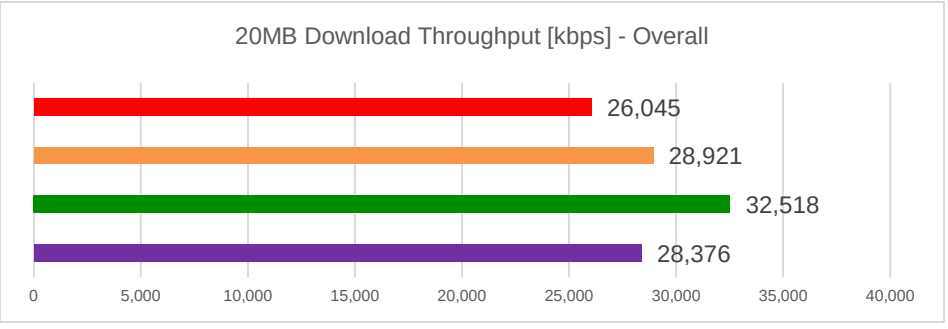


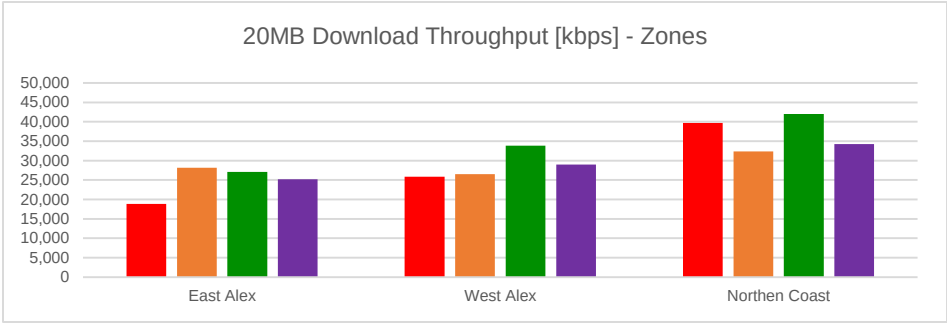


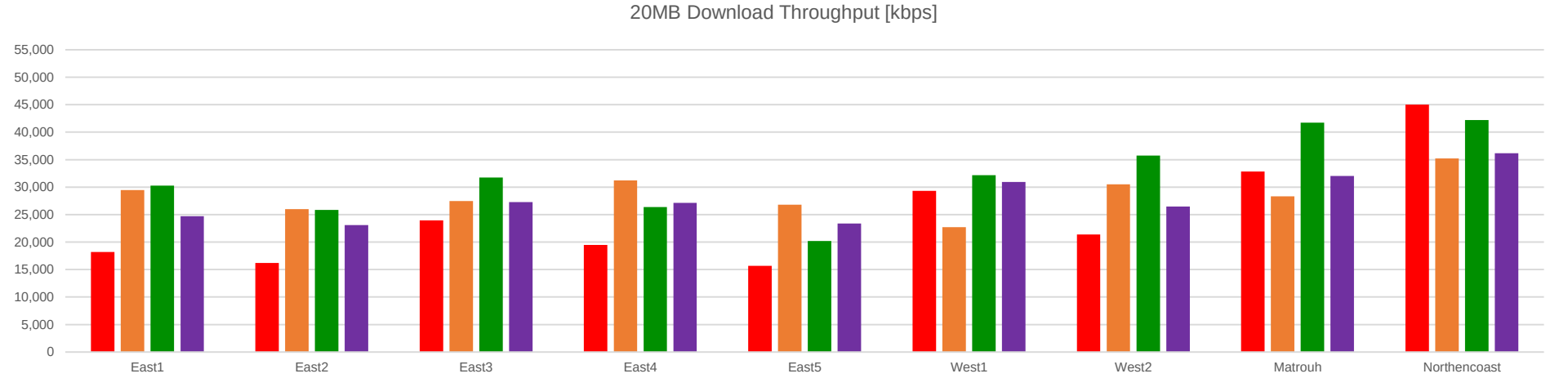


Throughout – Customer experience

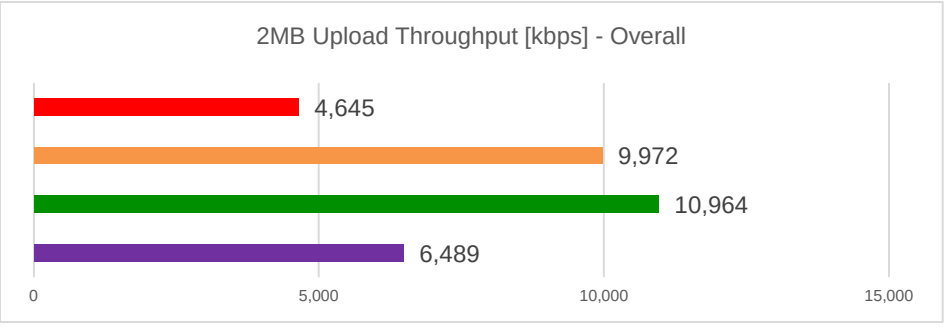
HTTP Download Throughput – Customer Experience

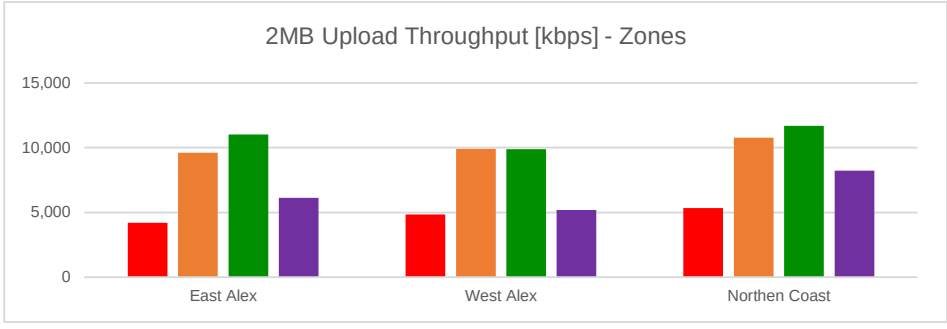


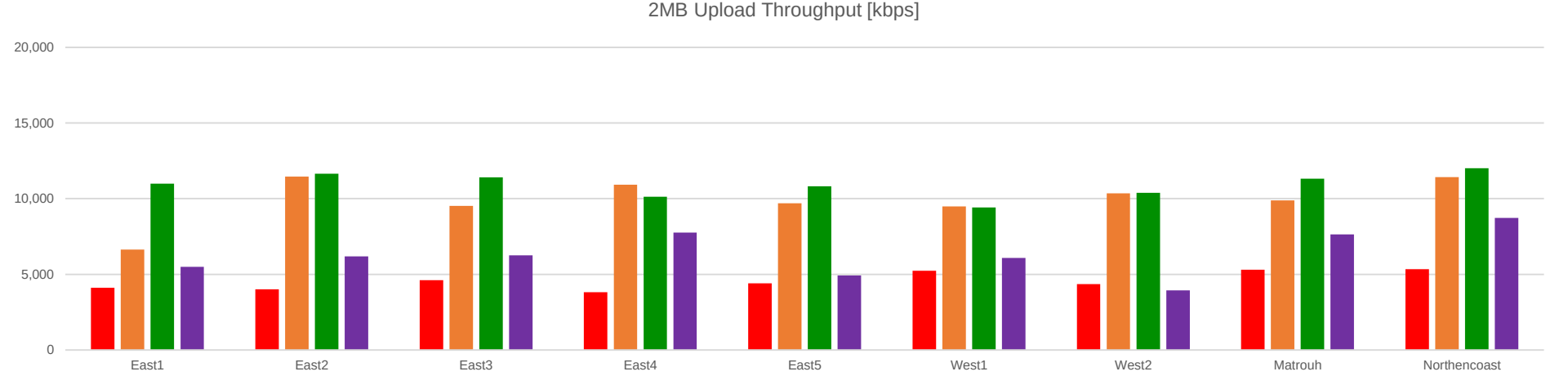


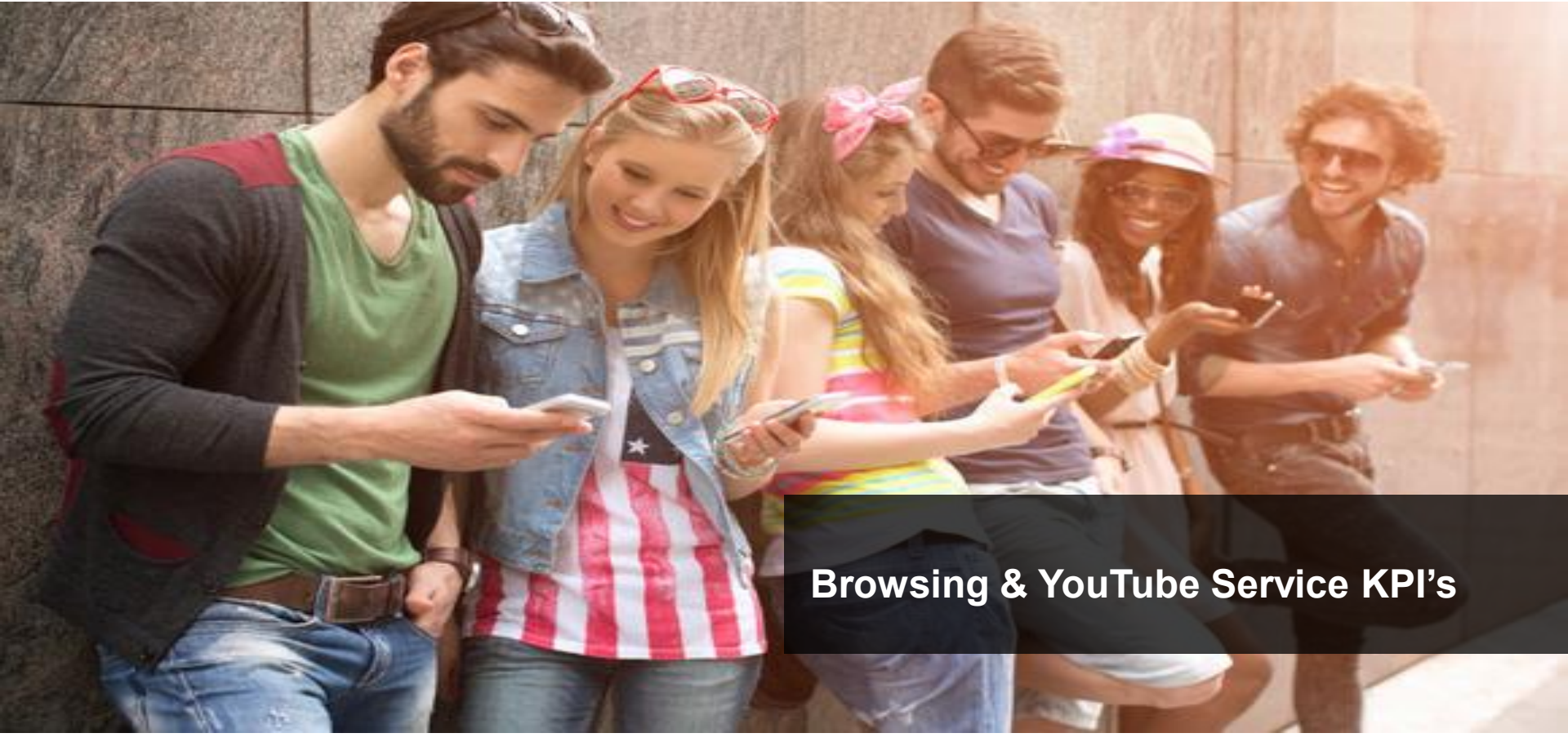


HTTP Upload Throughput – Customer Experience



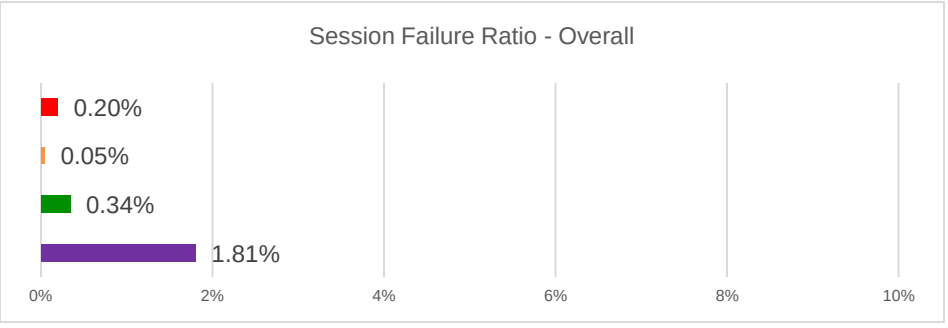


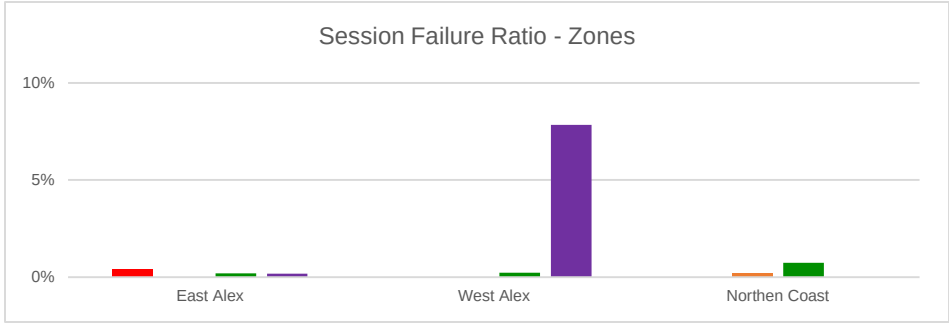


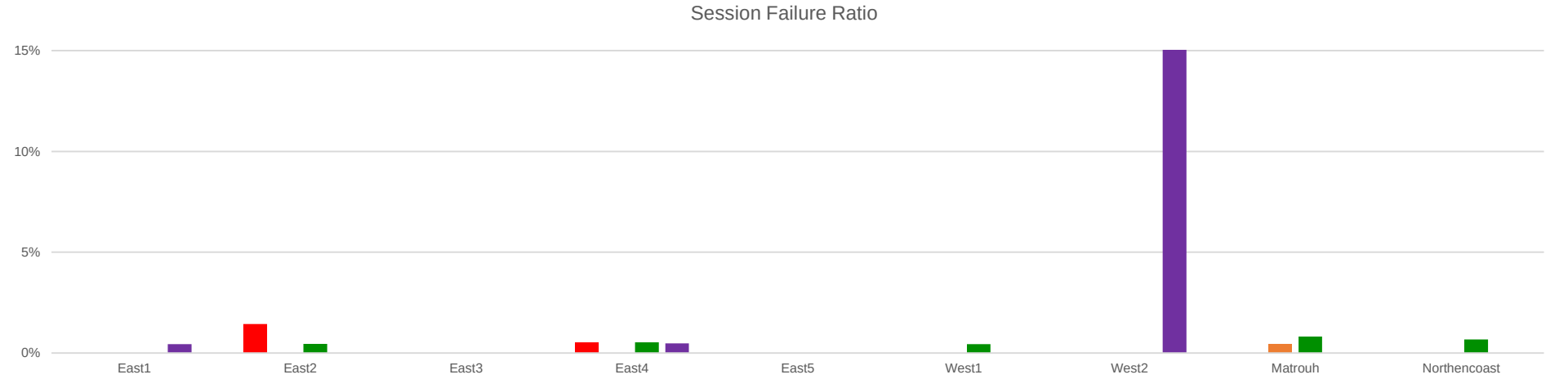


Browsing & YouTube Service KPI’s

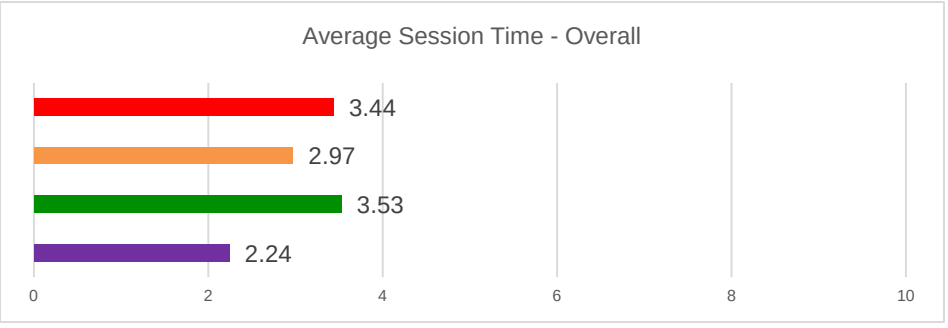
Session Failure Ratio

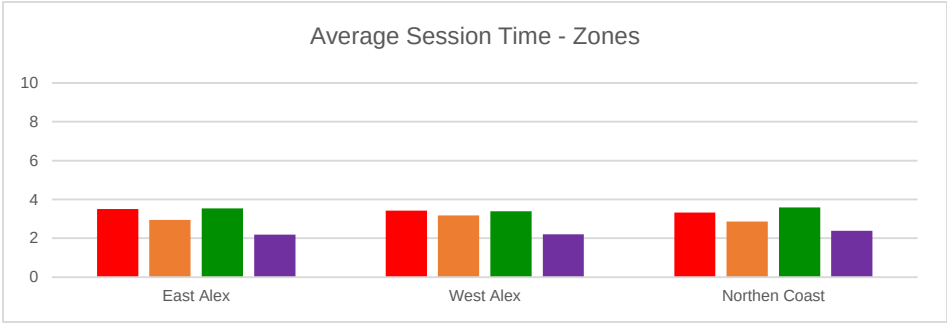


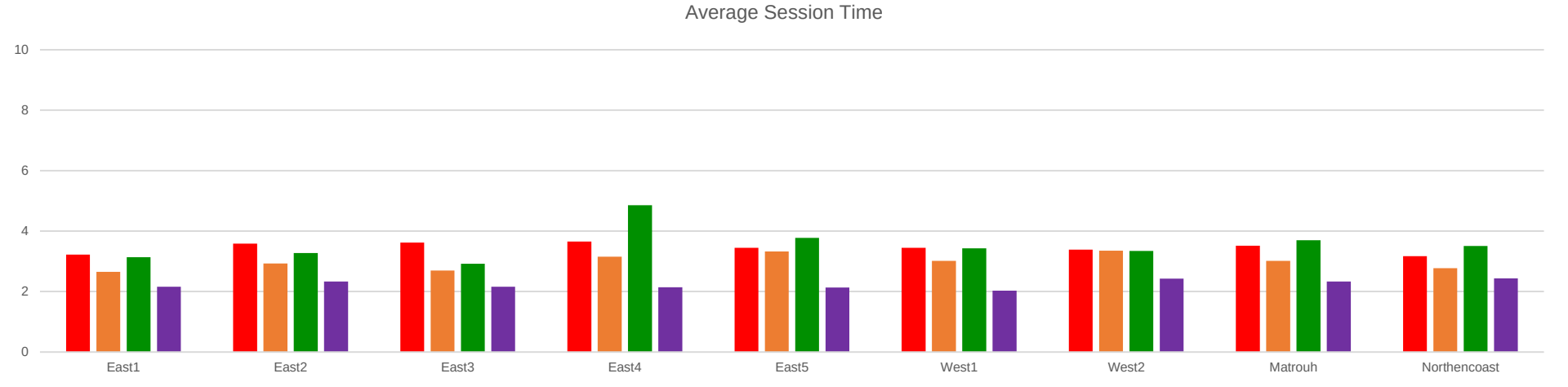




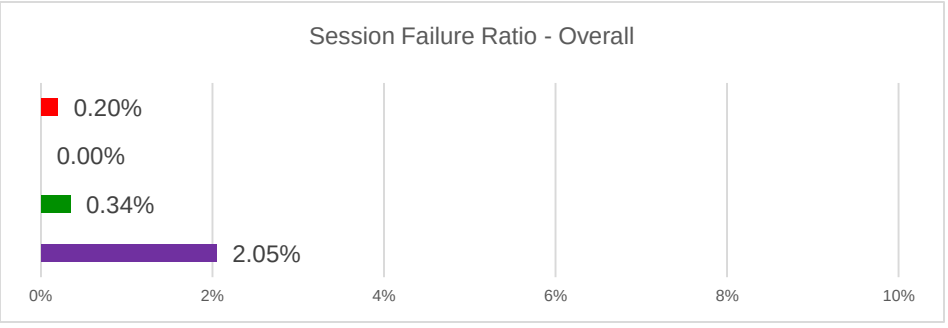
Session Time

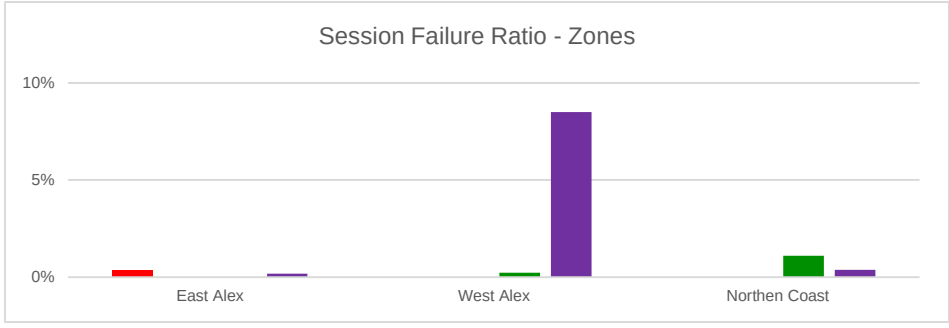


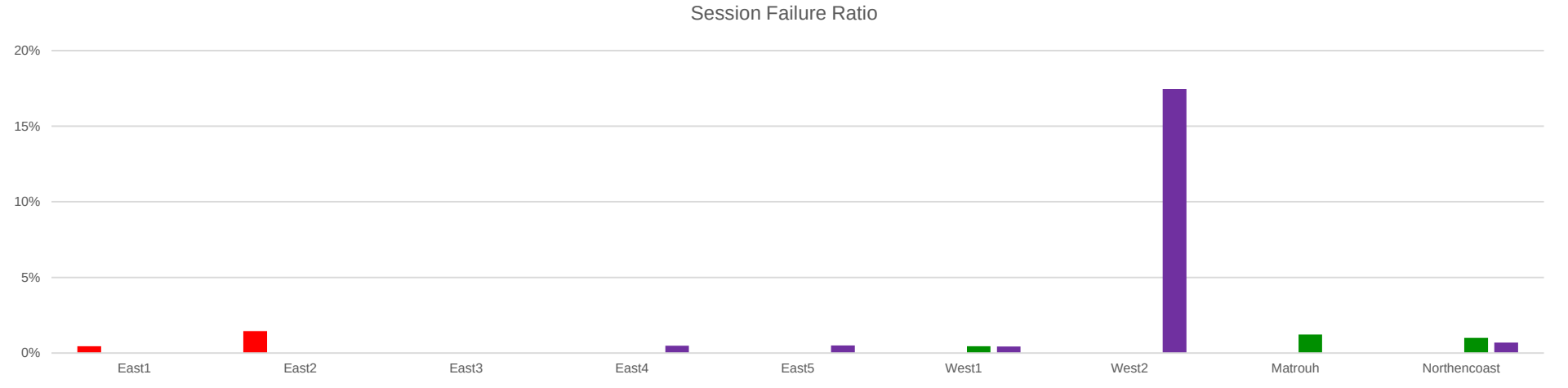




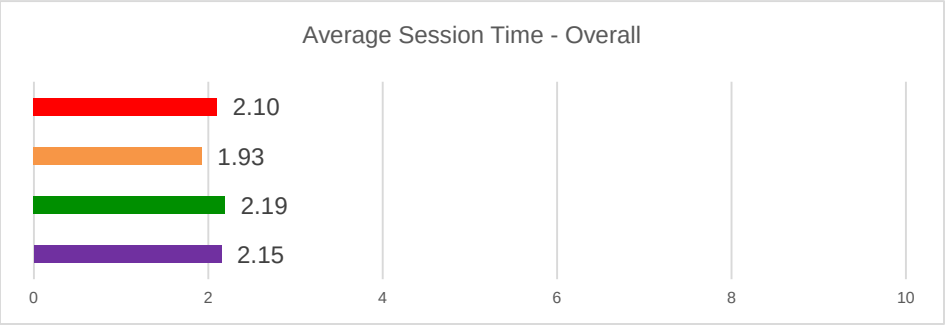
Google Session Failure Ratio

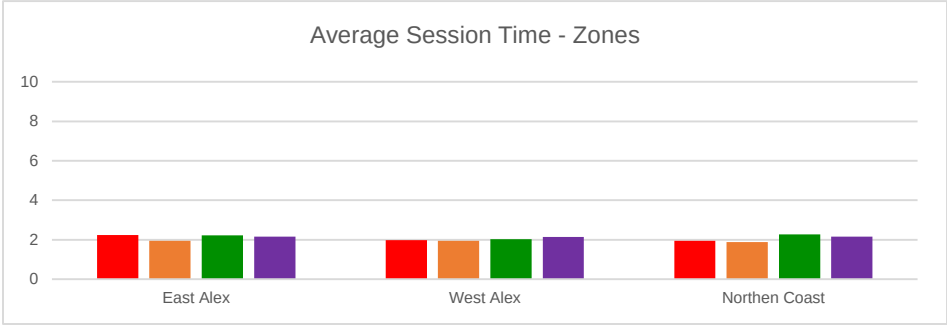


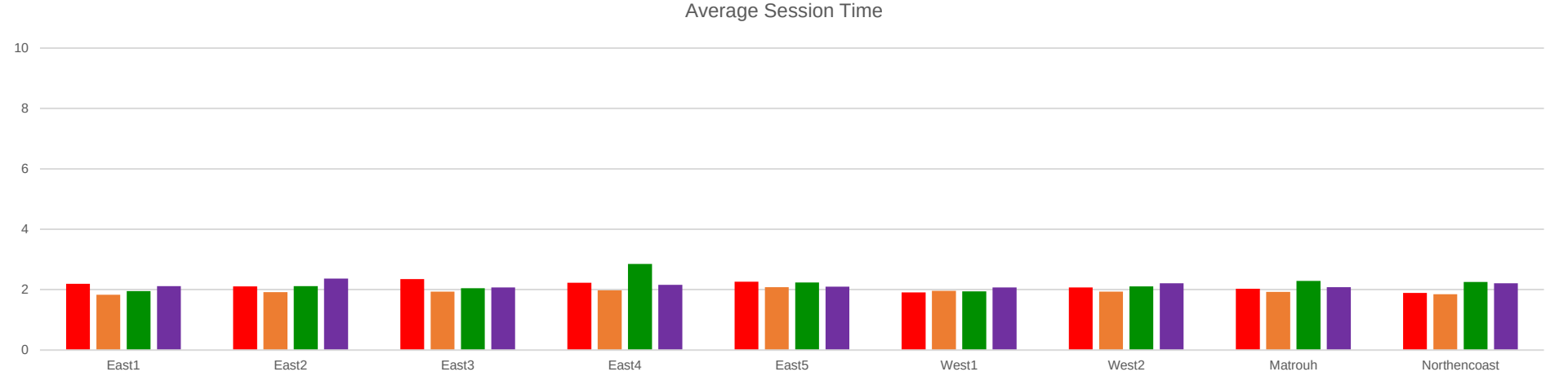




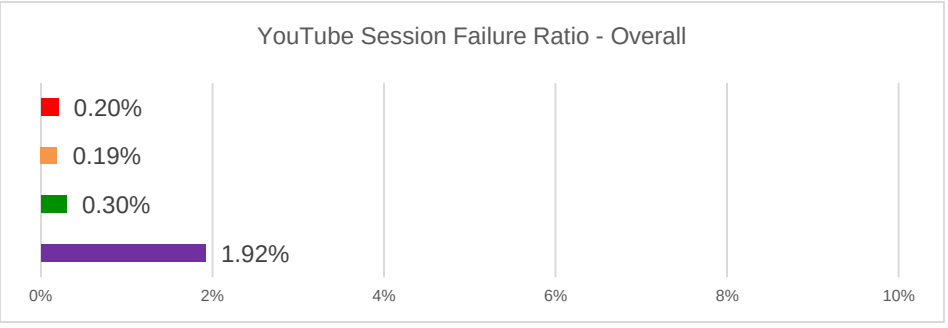
Google Session Time

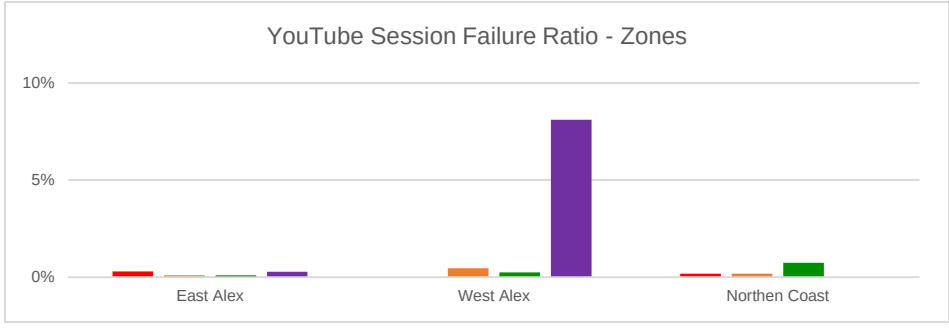


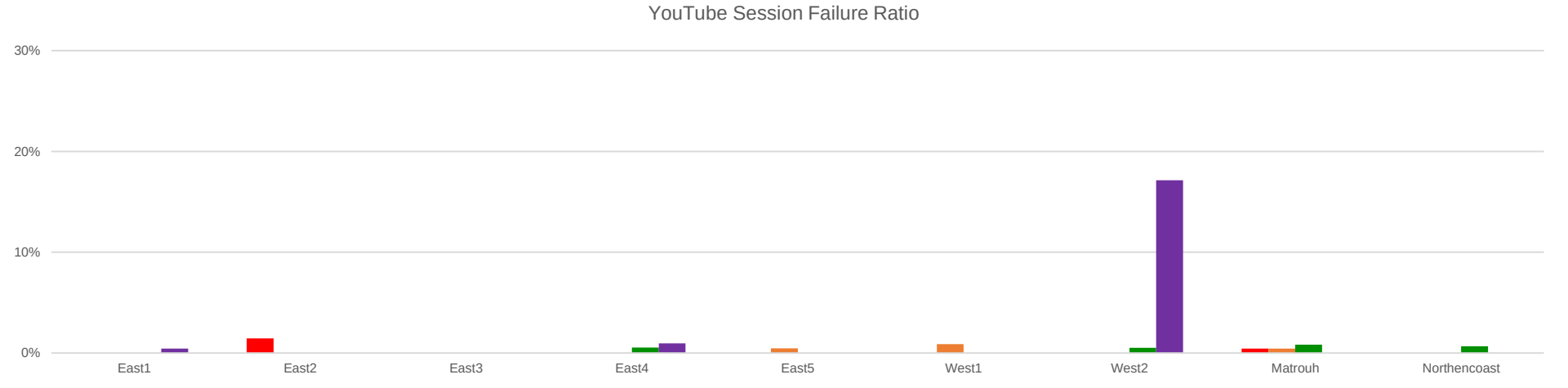




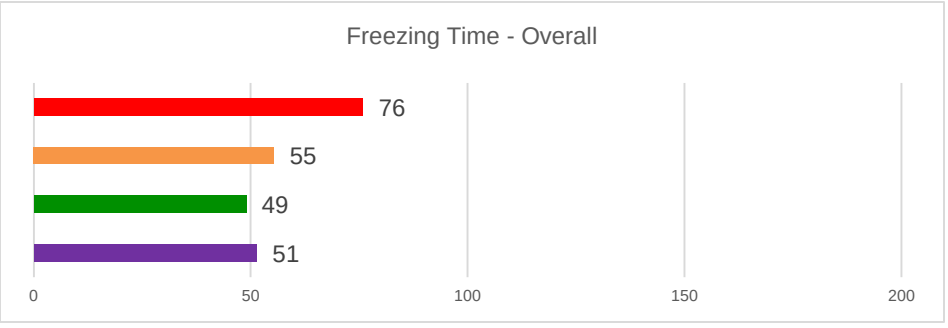
YouTube Session Failure Ratio

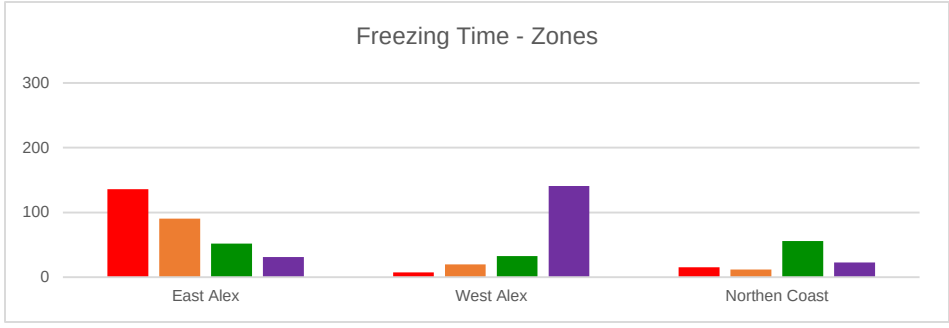


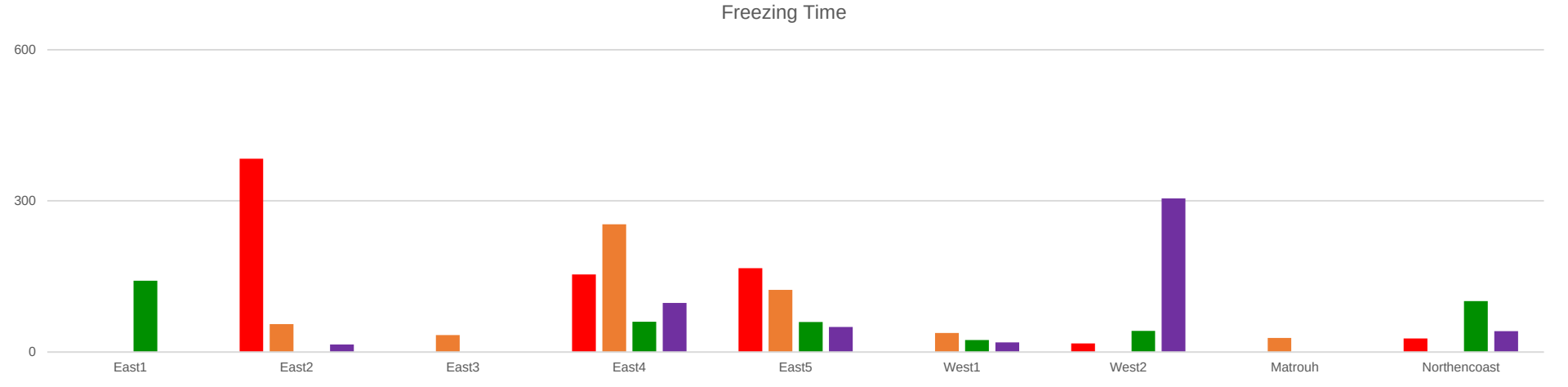




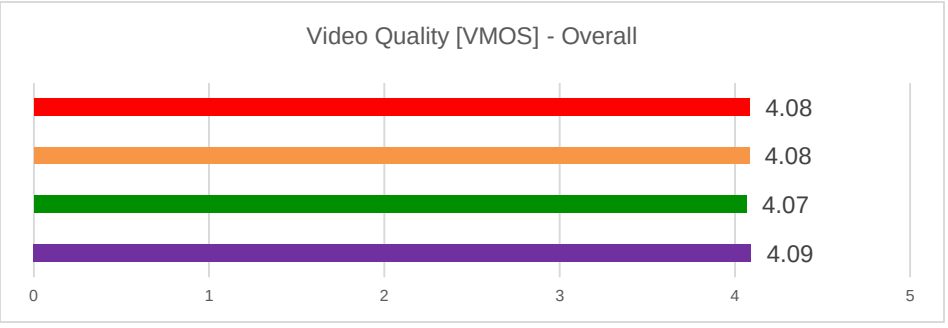
YouTube Freezing Time [msec]

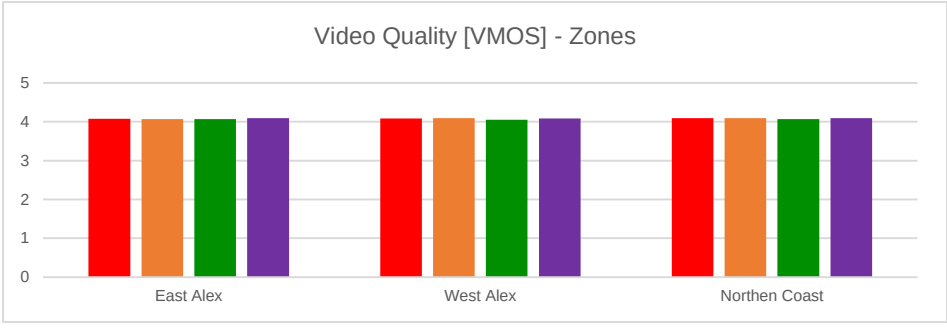


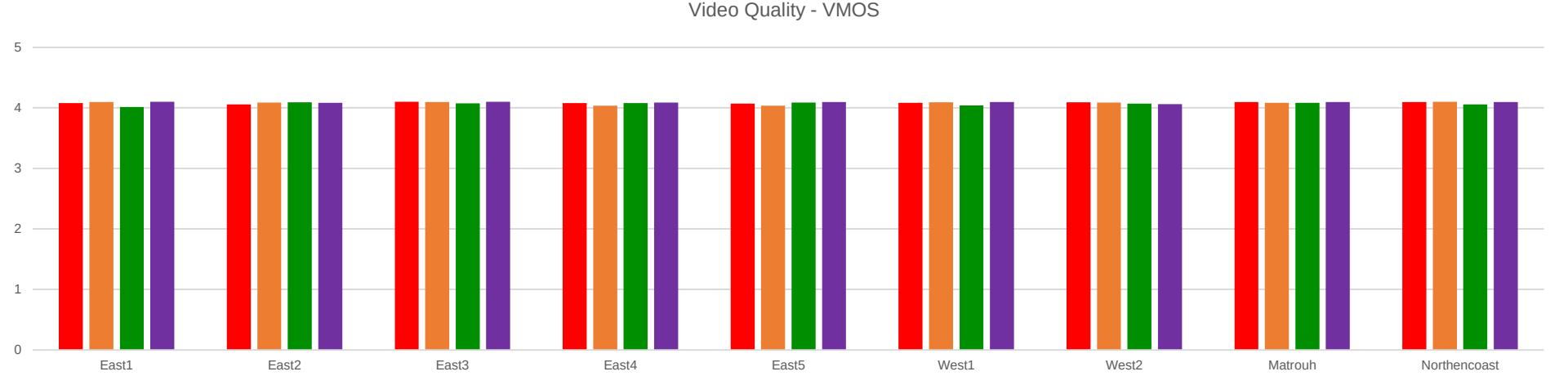




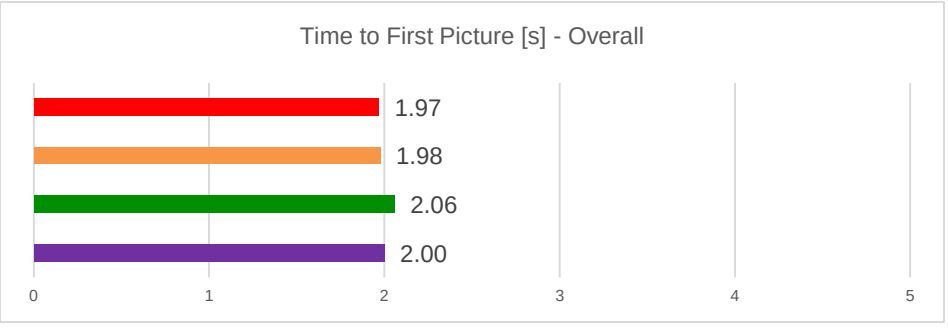
YouTube Video Quality

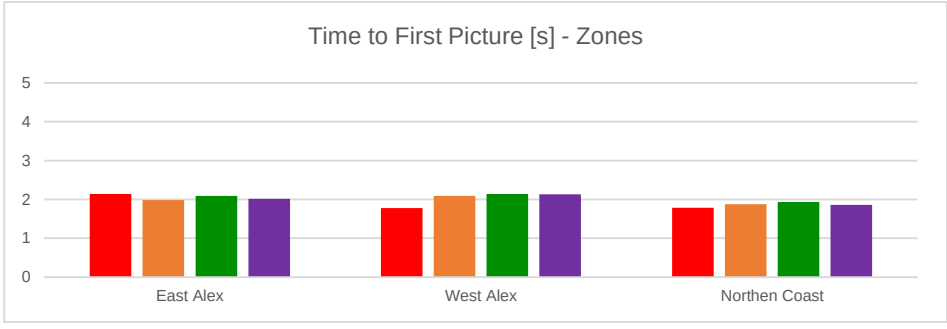


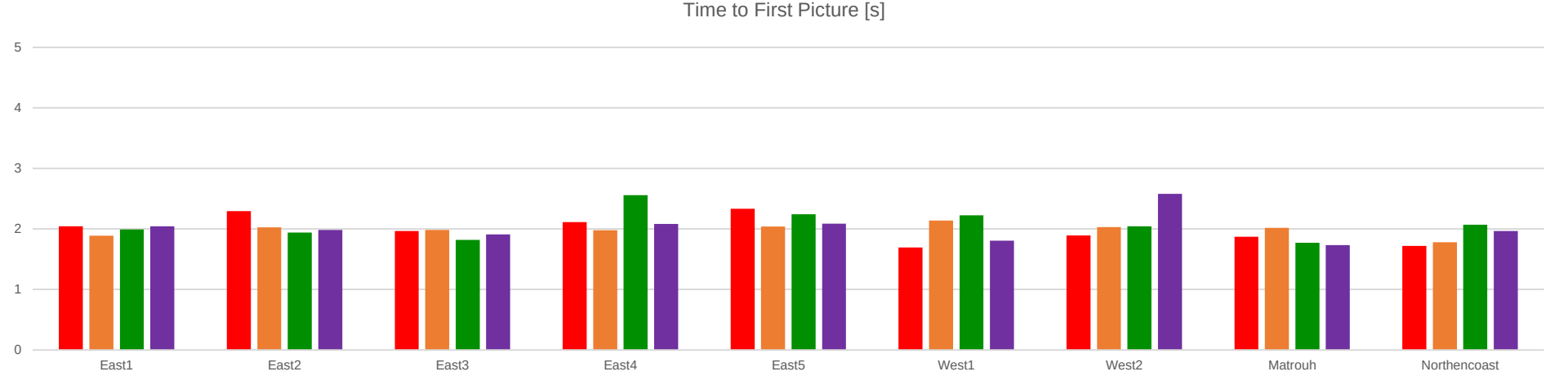




YouTube Time to 1st Picture

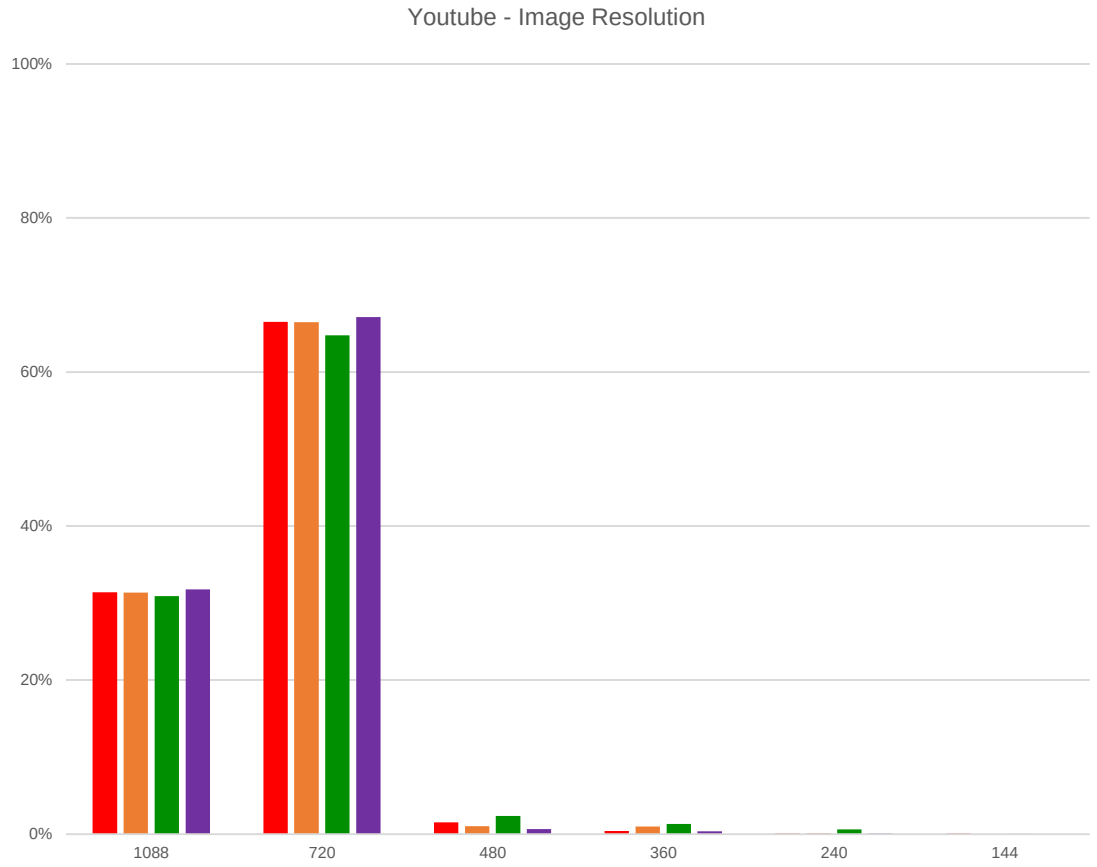






YouTube

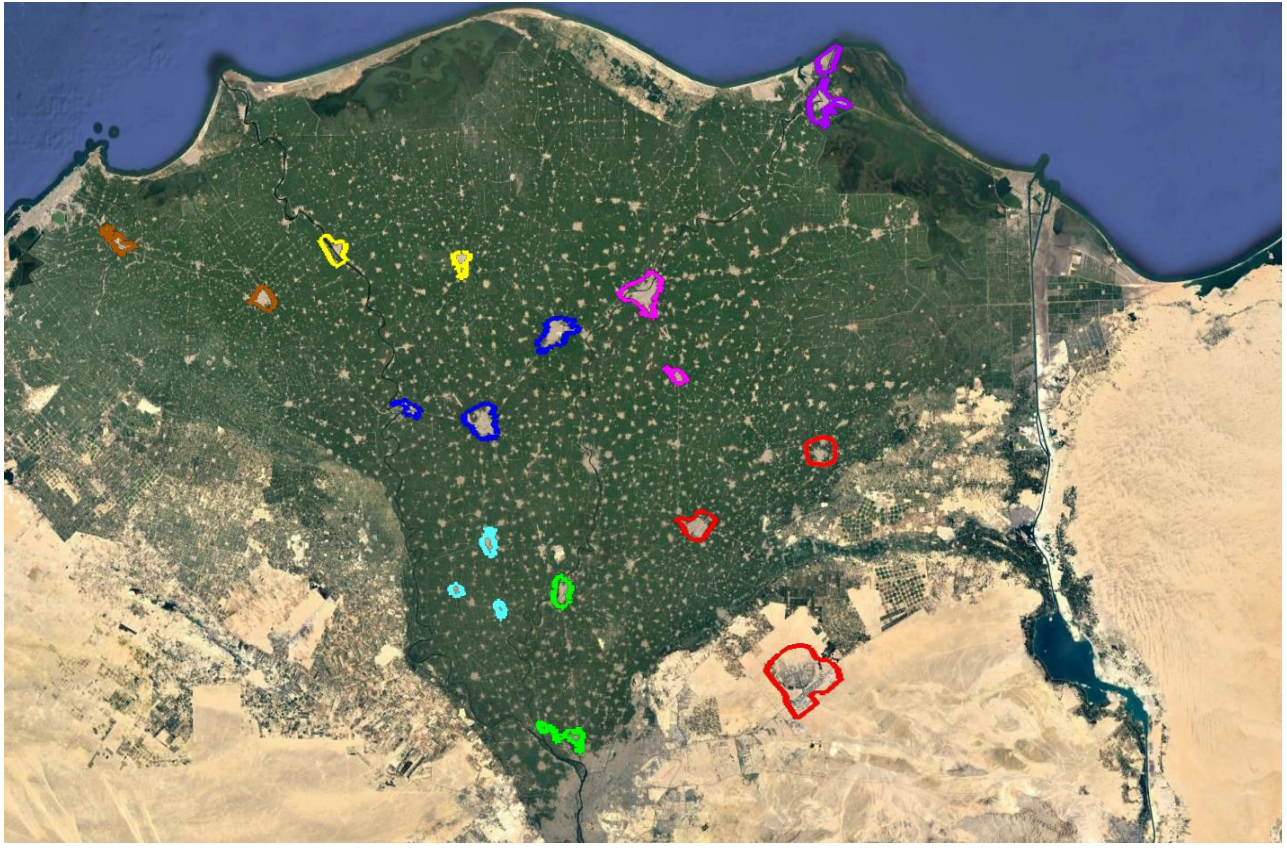
Image Resolution



Agenda

1. *Quantitative Information*
2. *Voice Service Quality & Performance - Cairo*
3. *Data Service Quality & Performance – Cairo*
4. *Voice Service Quality & Performance - Giza*
5. *Data Service Quality & Performance – Giza*
6. *Voice Service Quality & Performance - Alexandria*
7. *Data Service Quality & Performance - Alexandria*
8. ***Voice Service Quality & Performance - Delta***
9. *Data Service Quality & Performance – Delta*
10. *Voice Service Quality & Performance – Upper Egypt*
11. *Data Service Quality & Performance – Upper Egypt*
12. *Annexes*

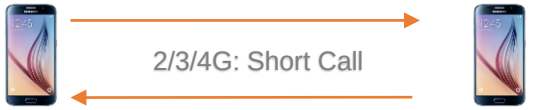
Zones Definition

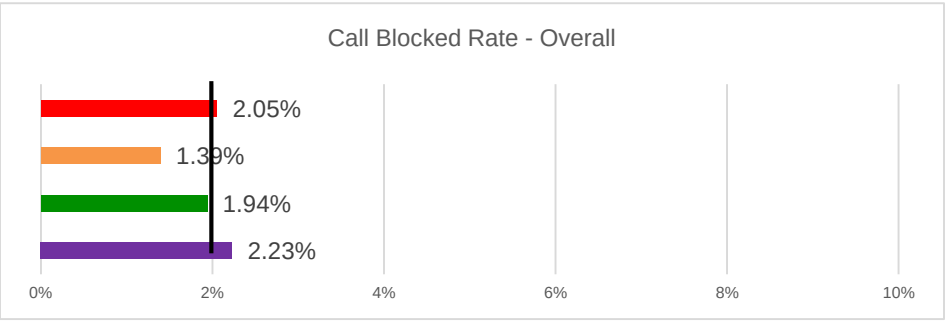


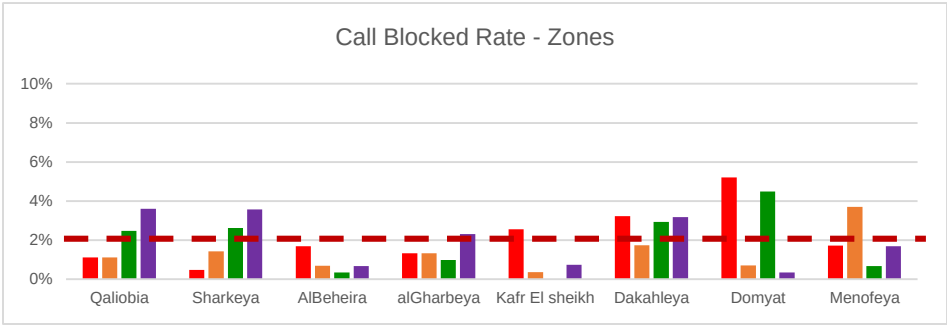
Delta Cities	
Delta Z1	Banha Qalyoub Qanatir
Delta Z2	10th of ramadan Faqous Zagazig
Delta Z3	Damnhour Kafr Eldawar
Delta Z4	Kafr el Zayat Tanta - Mahalla
Delta Z5	Desouk Kafr El sheikh
Delta Z6	Mansoura Senbelawen
Delta Z7	Domyat Ras El bar
Delta Z8	Menoufbagour Shebin el Koum

Voice Service KPI’s

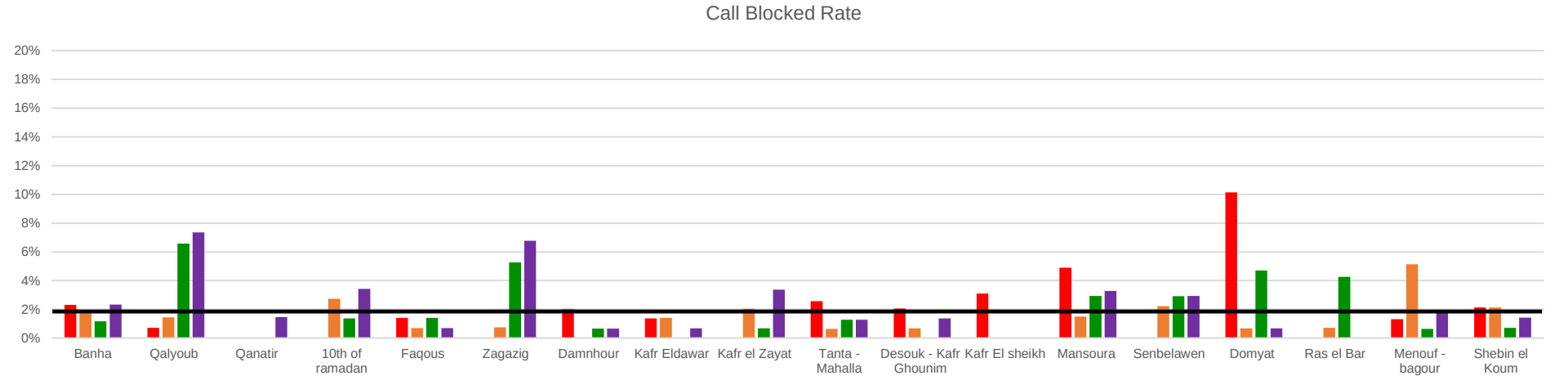
Accessibility: Call Blocked Rate



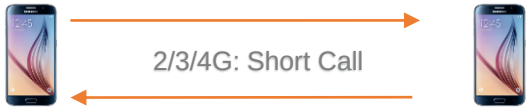


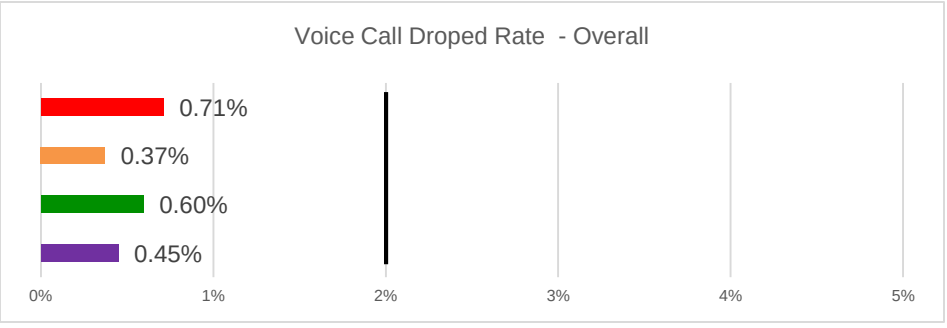


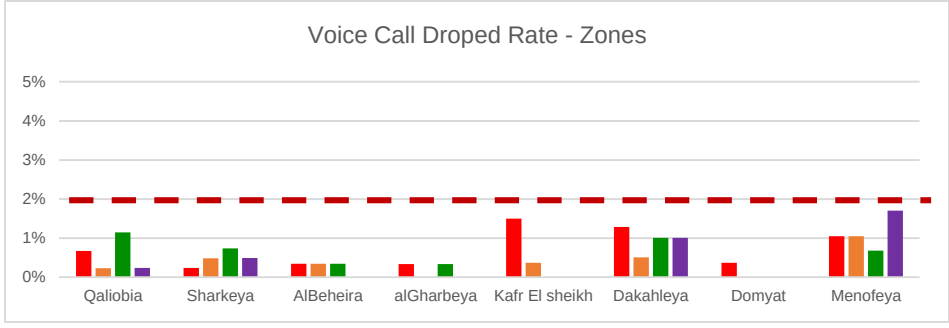
Call Blocked Rate *represents the ratio between unsuccessful call attempts and all calls made (both successful & unsuccessful).*



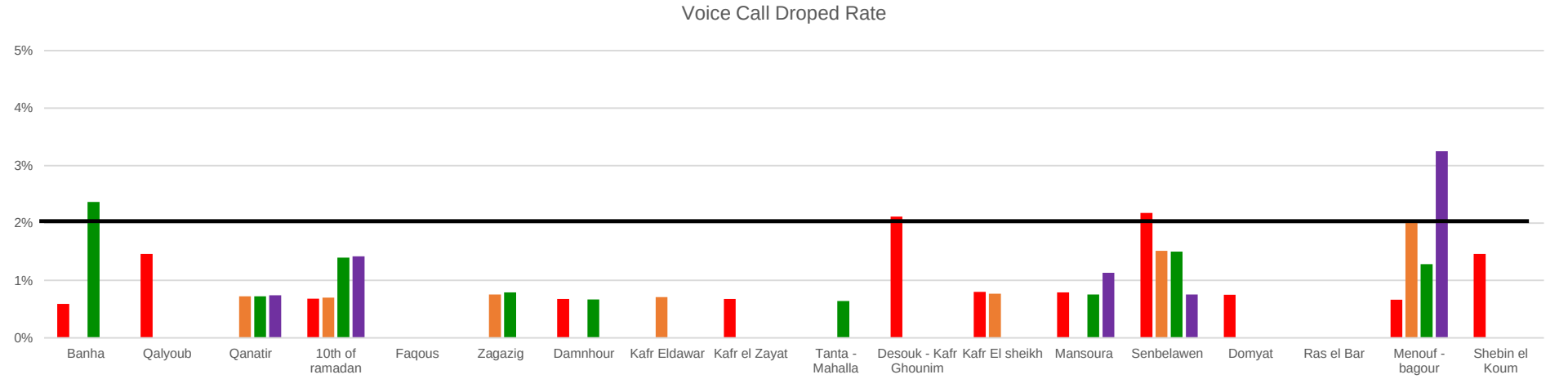
Retainability: Call Dropped Rate



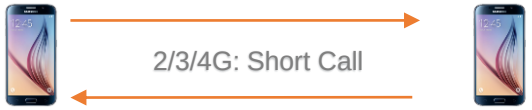


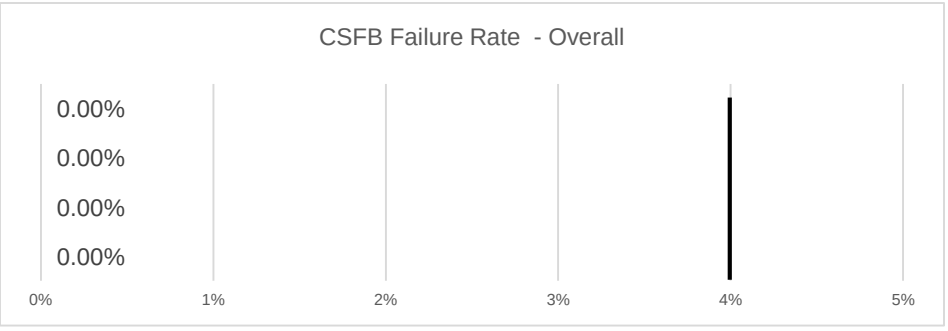


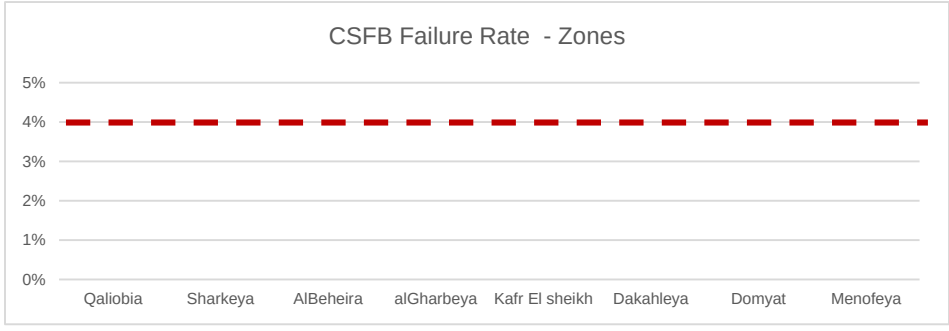
Voice Call Retainability *is represented by call drop rates.*



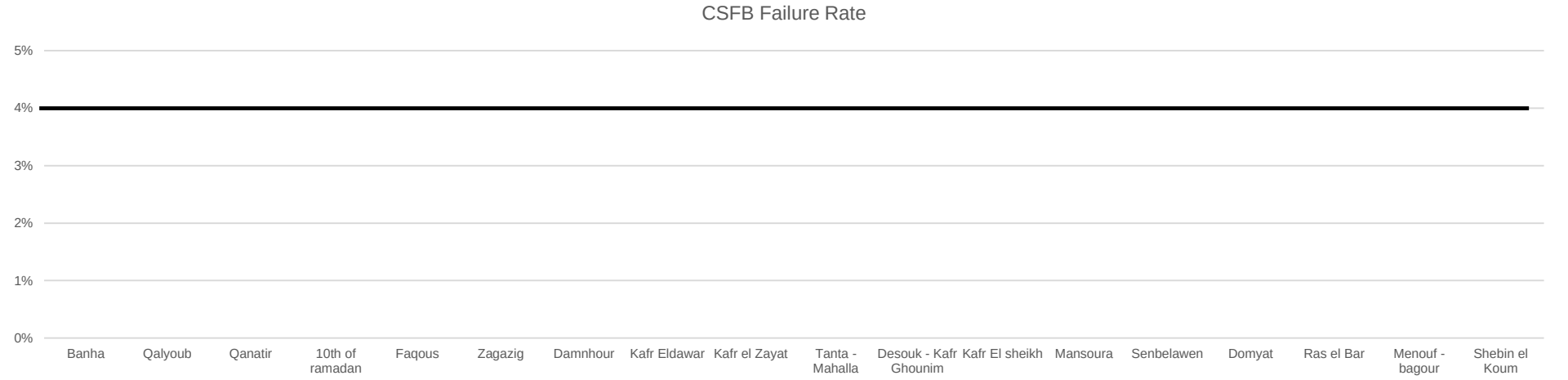
Accessibility: CSFB Failure Rate [%]



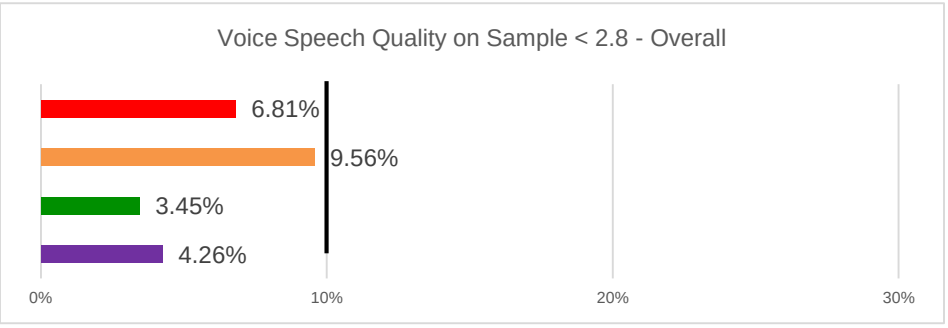


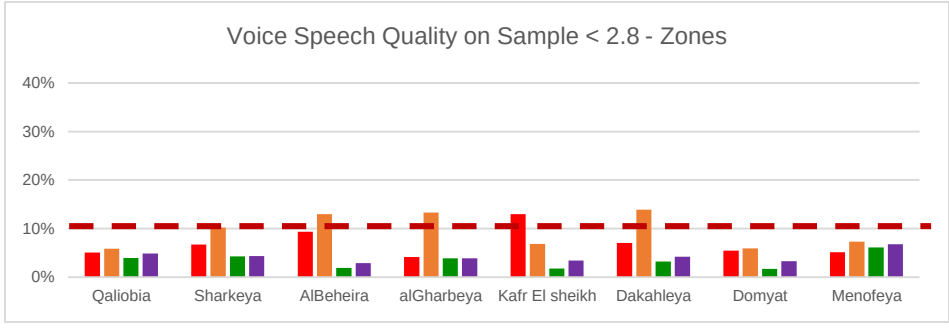


CSFB Failure Rate *represents the ratio between unsuccessful fall back attempt to lower technology than 4G (LTE) and all calls made (both successful & unsuccessful). When there is 4G (LTE) present before starting the session.*

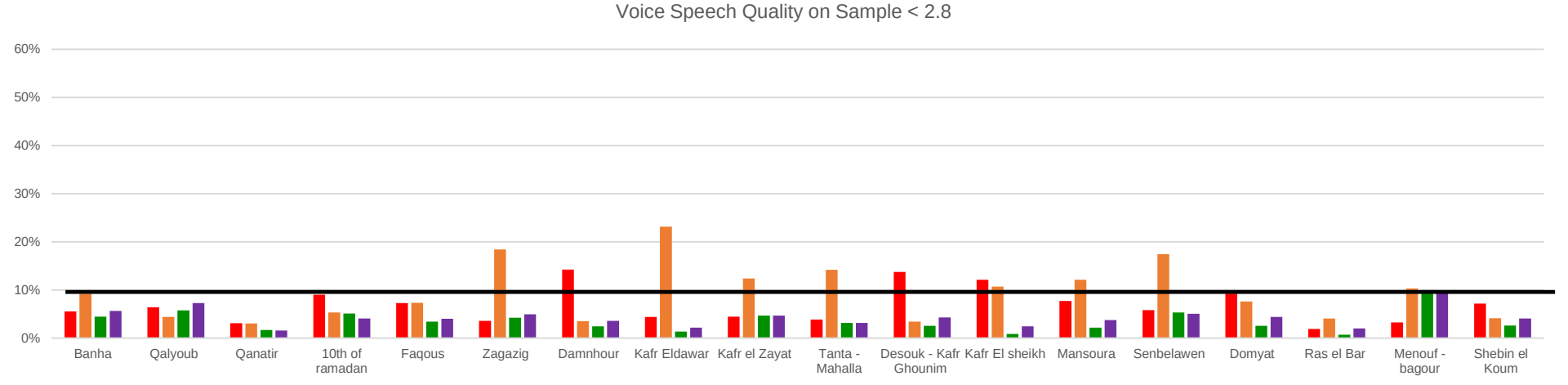


Speech Quality: MOS Voice Speech Quality < 2.8

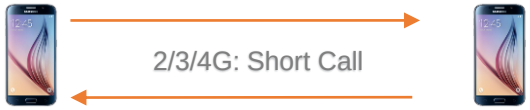


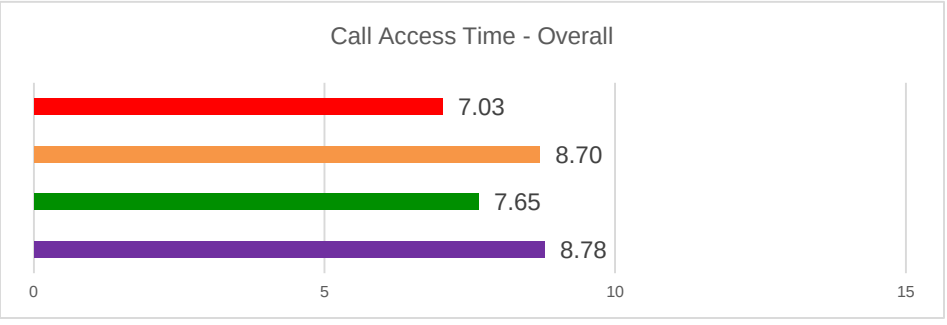


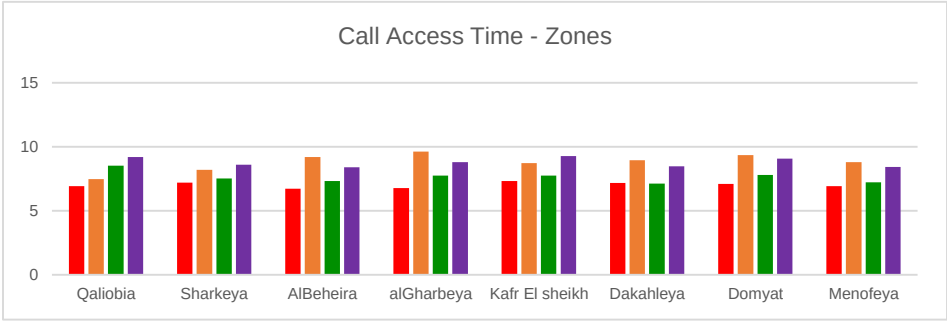
MOS Voice Speech Quality < 2.8 *represents the ratio between total number of MOS samples less than 2.8 all collected MOS samples*



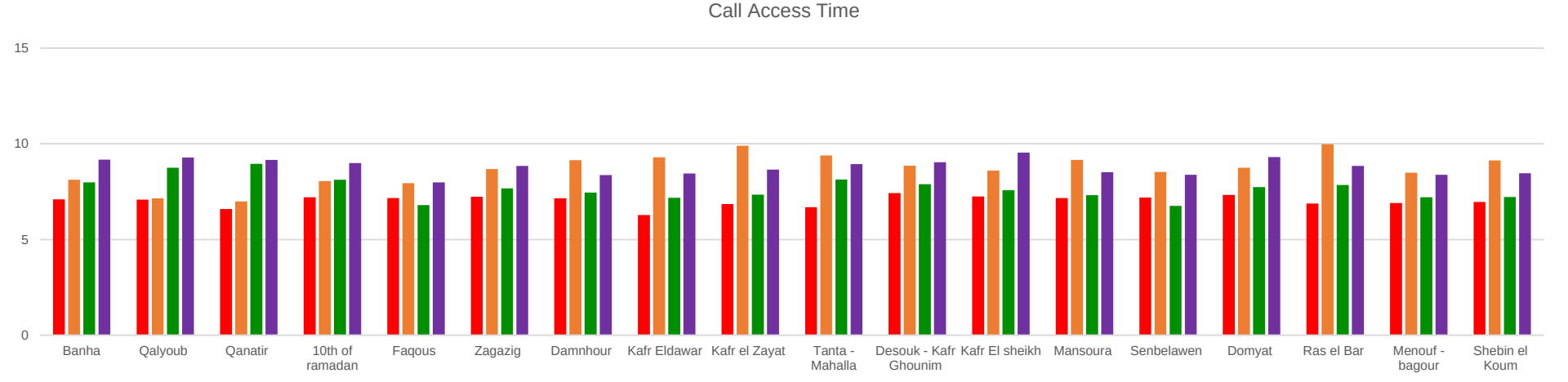
Accessibility: Call Access Time [sec.]



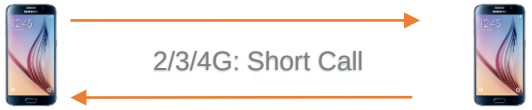


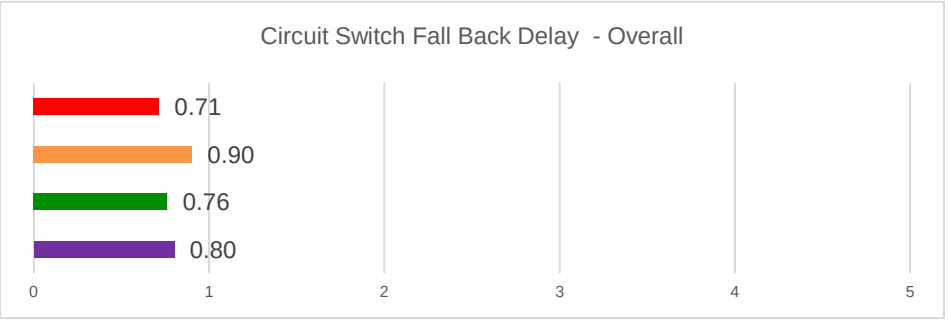


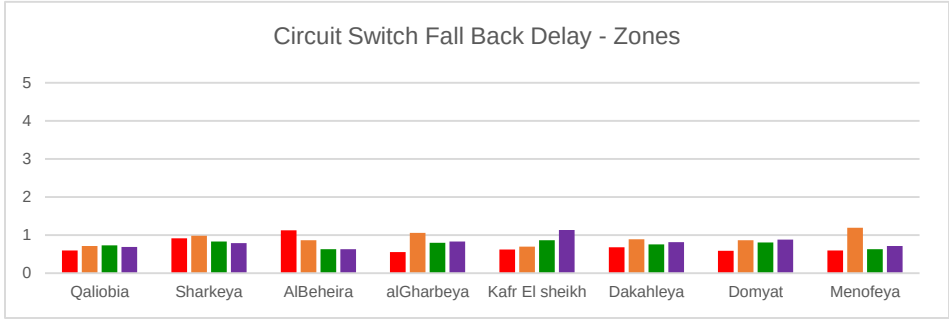
Call Access *represents the period of time elapsed from the sending of a complete destination address (target number) to the setting up of a call to the receiving terminal*.



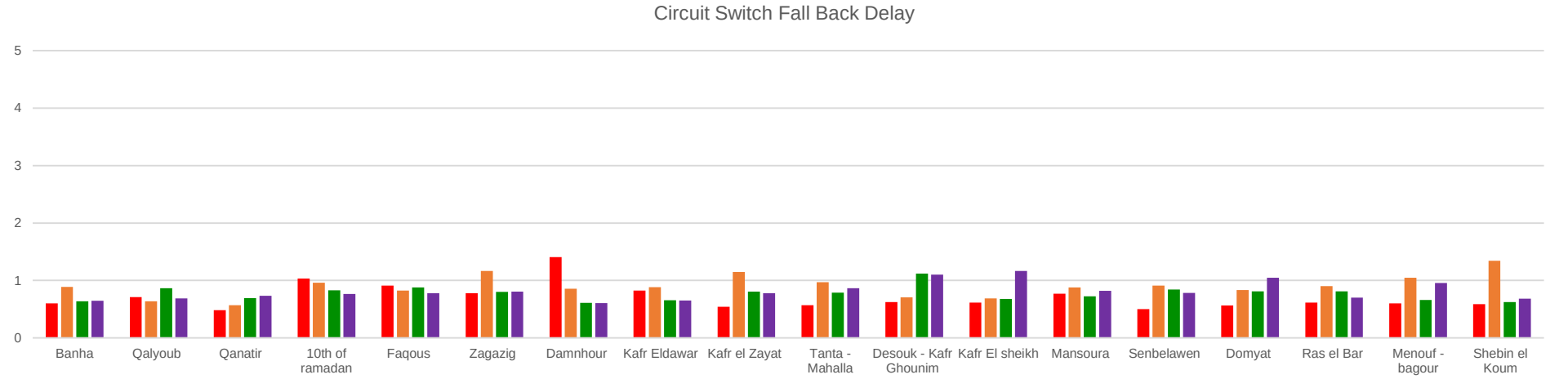
Accessibility: CSFB Delay [sec.]



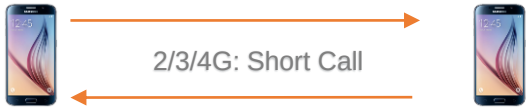


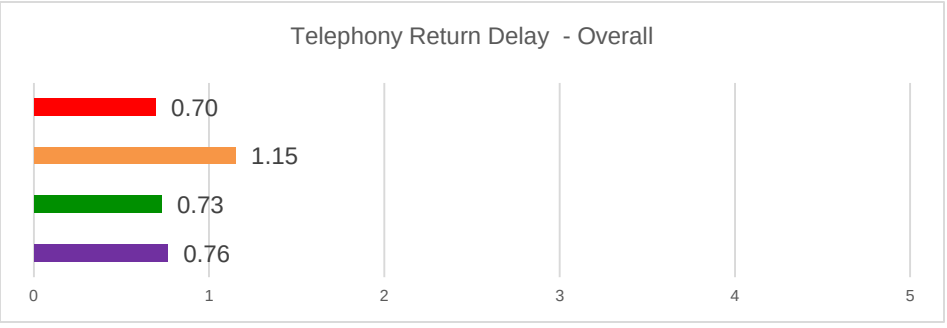


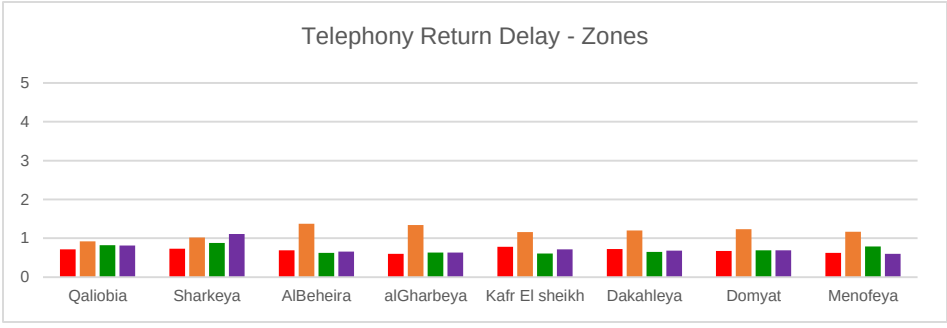
CSFB Delay *represents the period of time to overlay 3G/2G environment instead of handling calls in 4G (LTE). Depending on the CSFB strategy.*



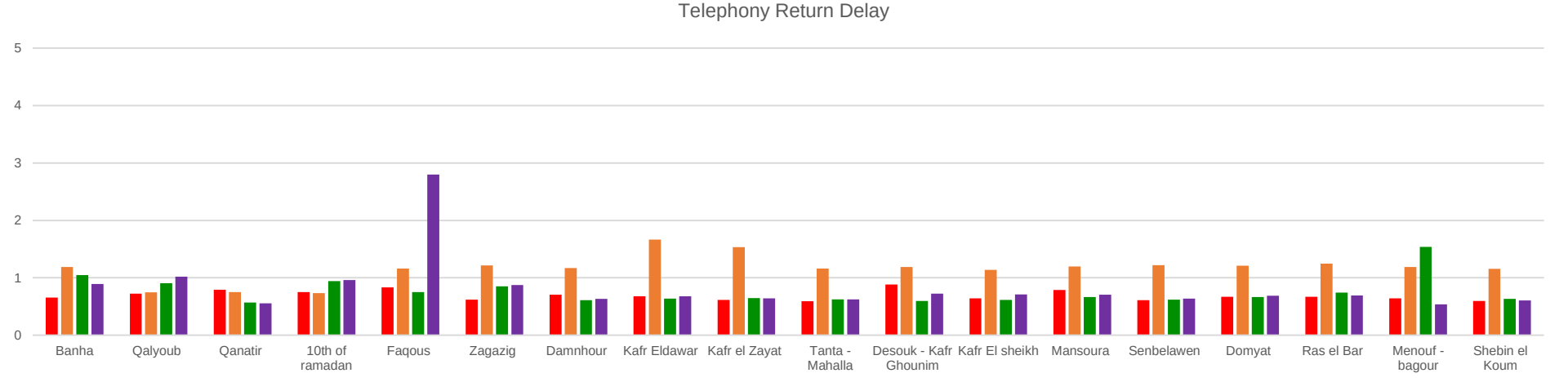
Accessibility: Telephony Return Delay [sec.]





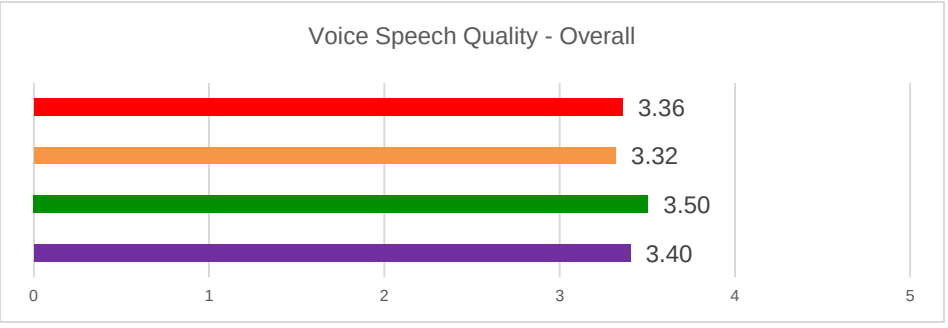


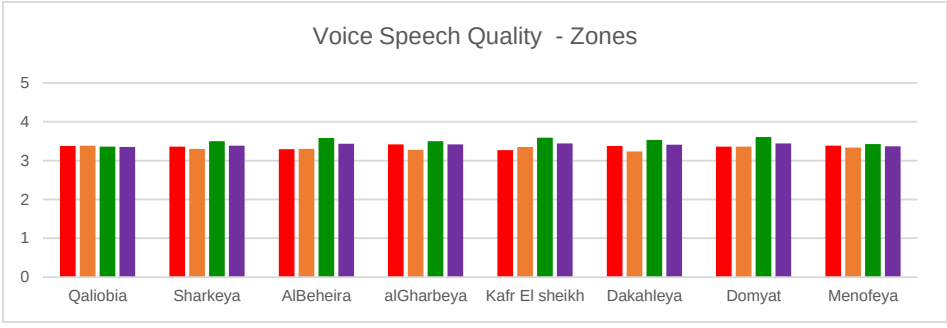
Telephony Return Delay *measures the time that a UE uses to re-join the LTE (4G) network after call end*

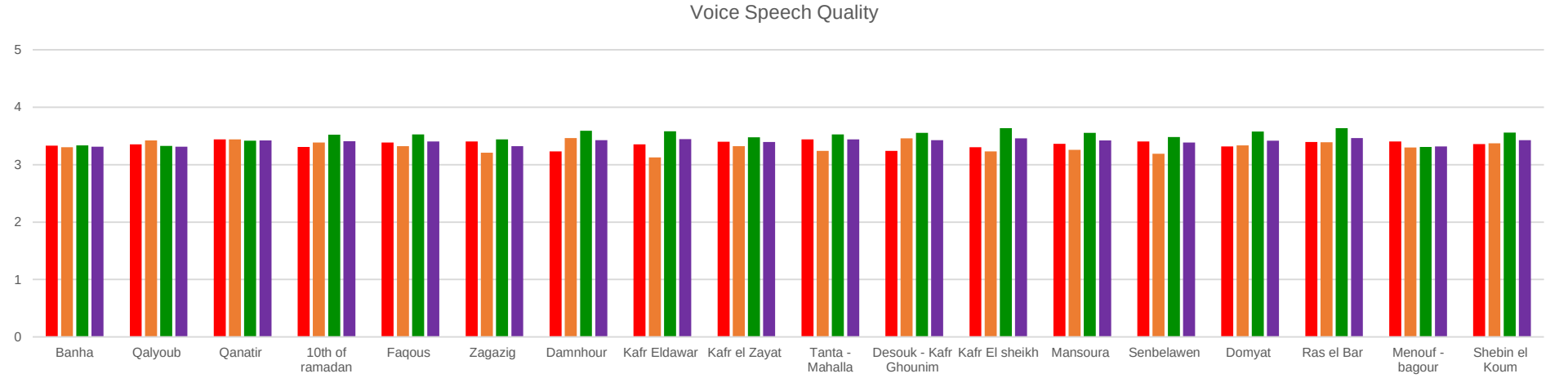


Voice Speech Quality KPI’s

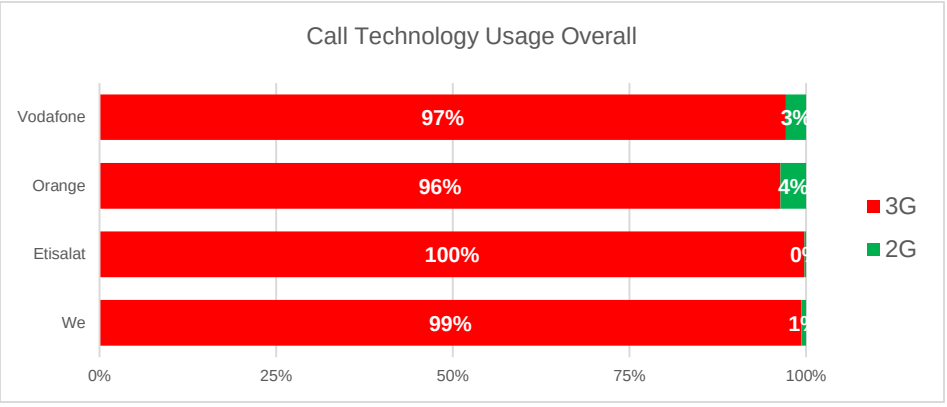
Speech Quality: MOS Scores





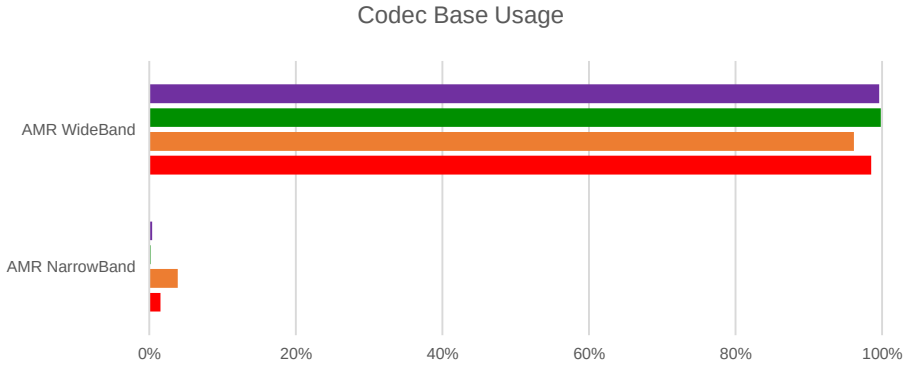


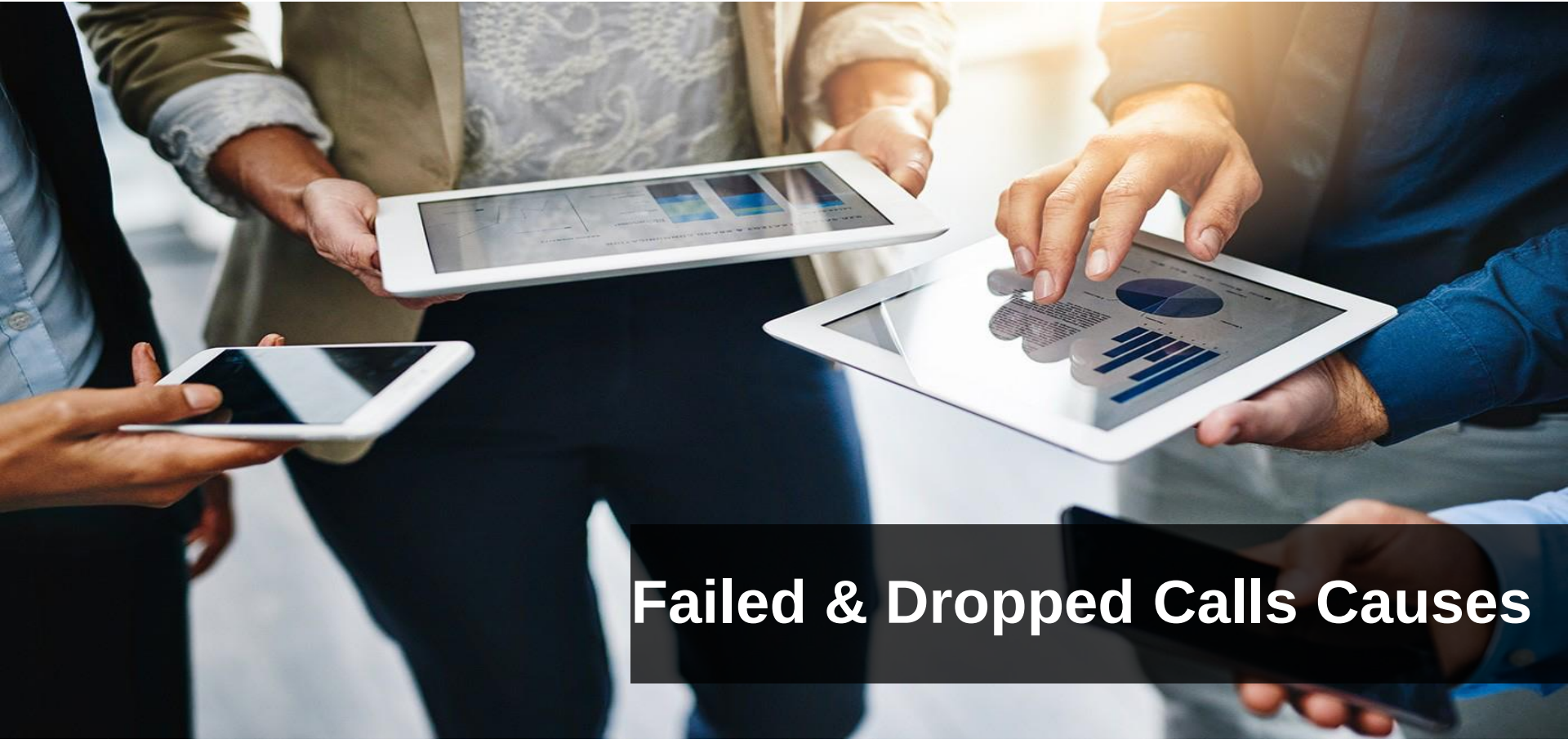
Speech Quality: Call technology Usage & Codec Base Usage



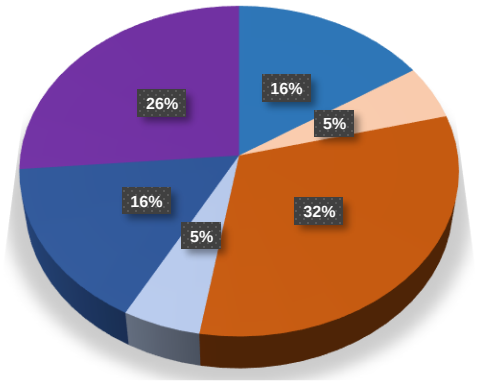
Call technology Usage *represents the call technology used over call period. The more calls on 3G (UMTS) the better MOS served.*

Codec Base Usage *represents the codec used over the call where AMR wideband (AMR WB) leads to better voice quality experience by the end user than the AMR Narrowband (AMR NB)*

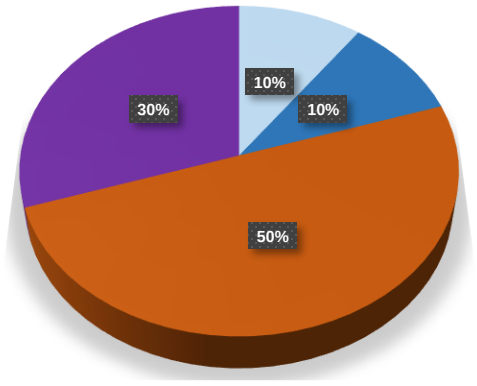



Failed & Dropped Calls Causes

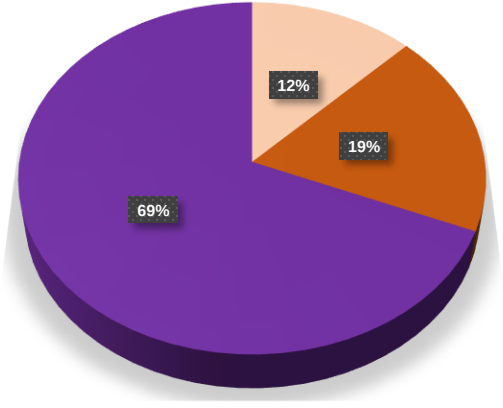
Analysis: Dropped Calls Causes



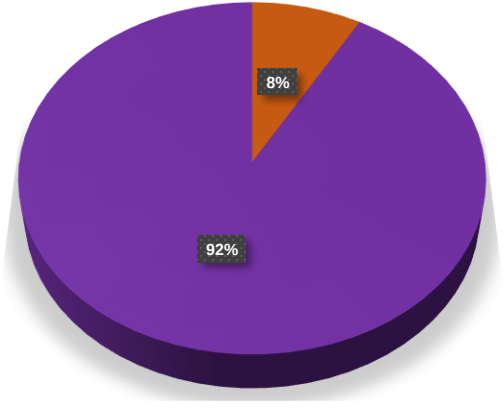
2G Quality
3G Coverage
3G Quality
Mobility Issue
No Service
RAN Issue



2G Coverage
2G Quality
3G Quality
RAN Issue



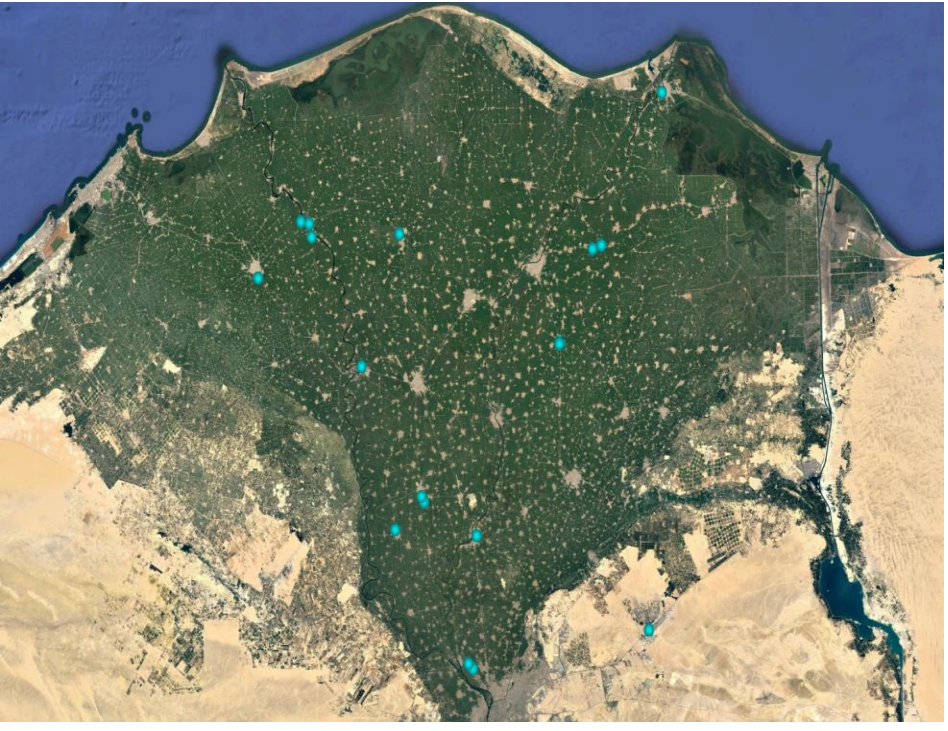
3G Coverage
3G Quality
RAN Issue



3G Quality
RAN Issue

All Operators: Dropped Calls Locations 1/2

vodafone



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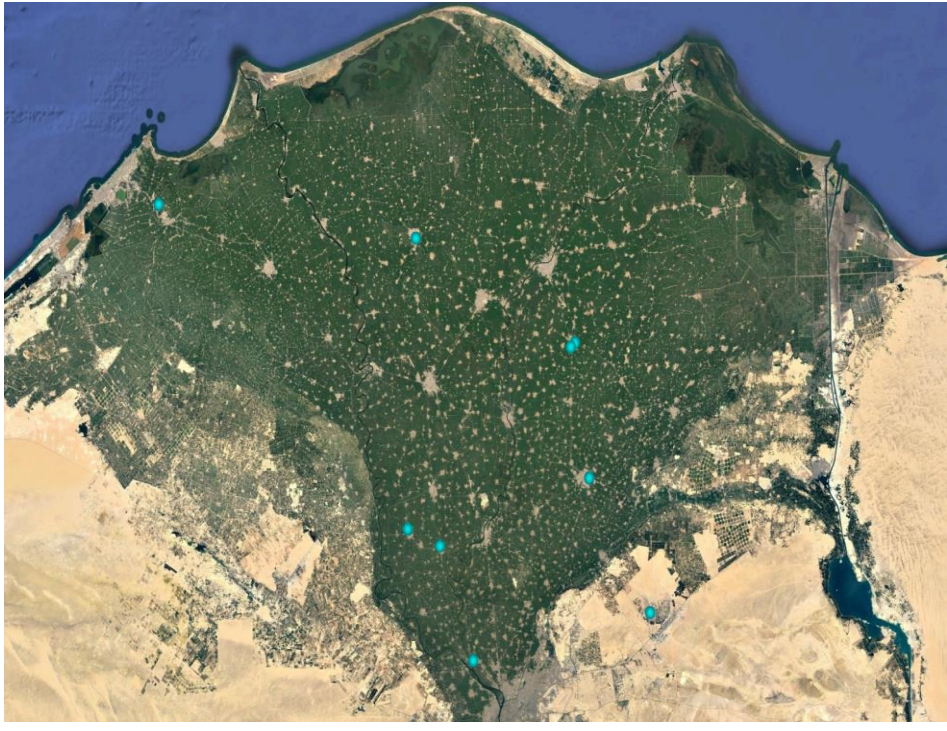
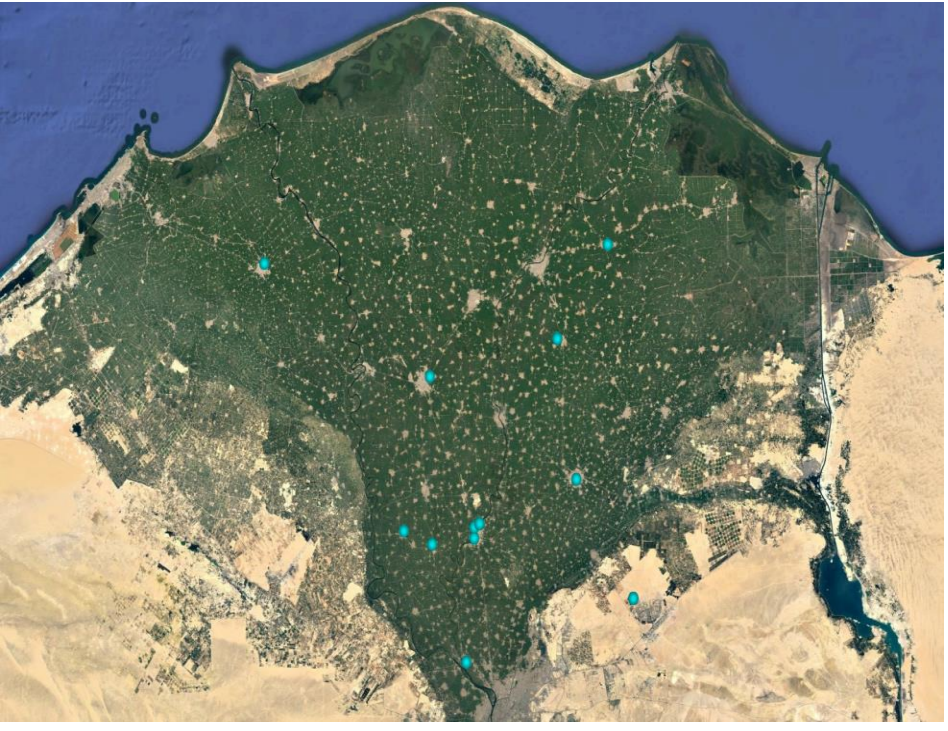
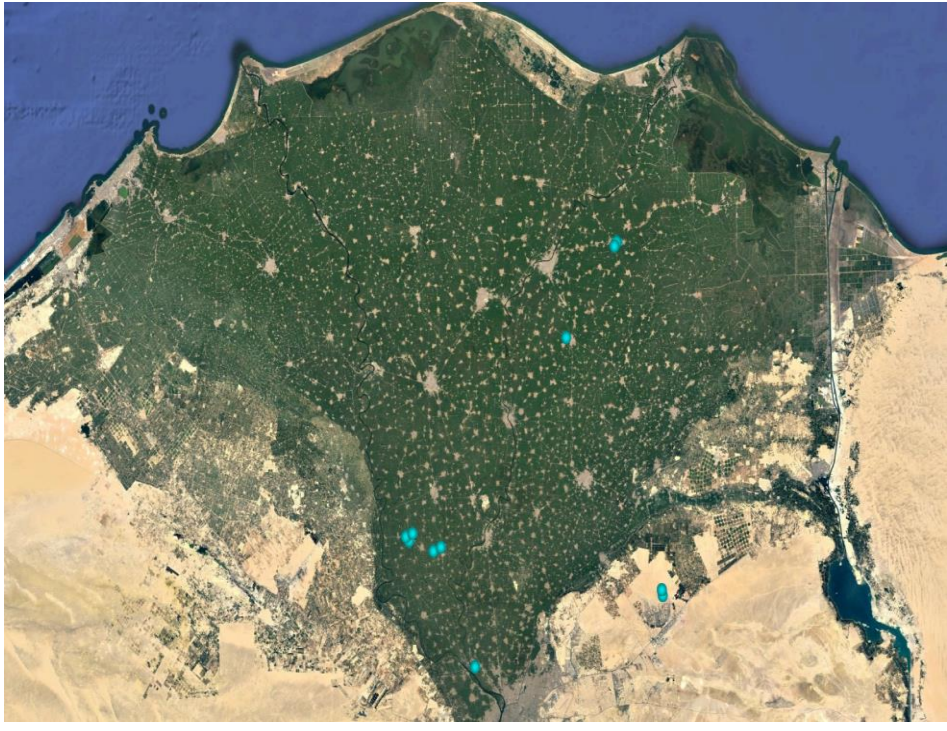


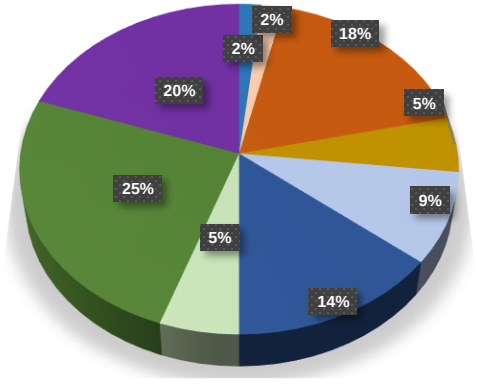
All Operators: Dropped Calls Locations 2/2





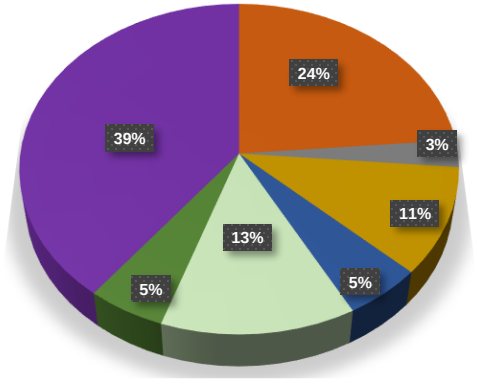
Analysis: Failed Calls Causes

vodafone



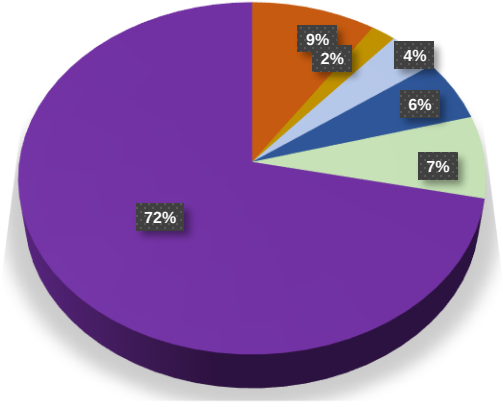
- 2G Quality
- 3G Coverage
- 3G Quality
- CSFB Issue
- Mobility Issue
- No Service
- Other
- paging Issue
- RAN Issue

orange



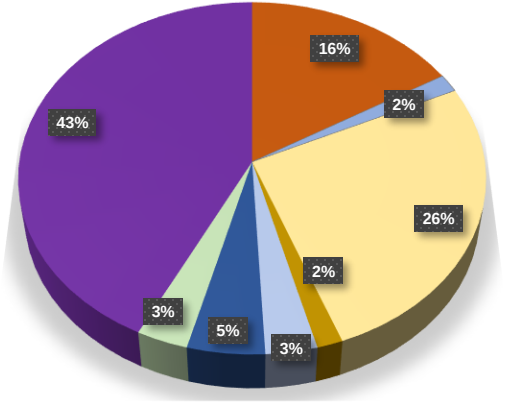
- 3G Quality
- 4G Quality
- CSFB Issue
- No Service
- Other
- paging Issue
- RAN Issue

etisalat



- 3G Quality
- CSFB Issue
- Mobility Issue
- No Service
- Other
- RAN Issue

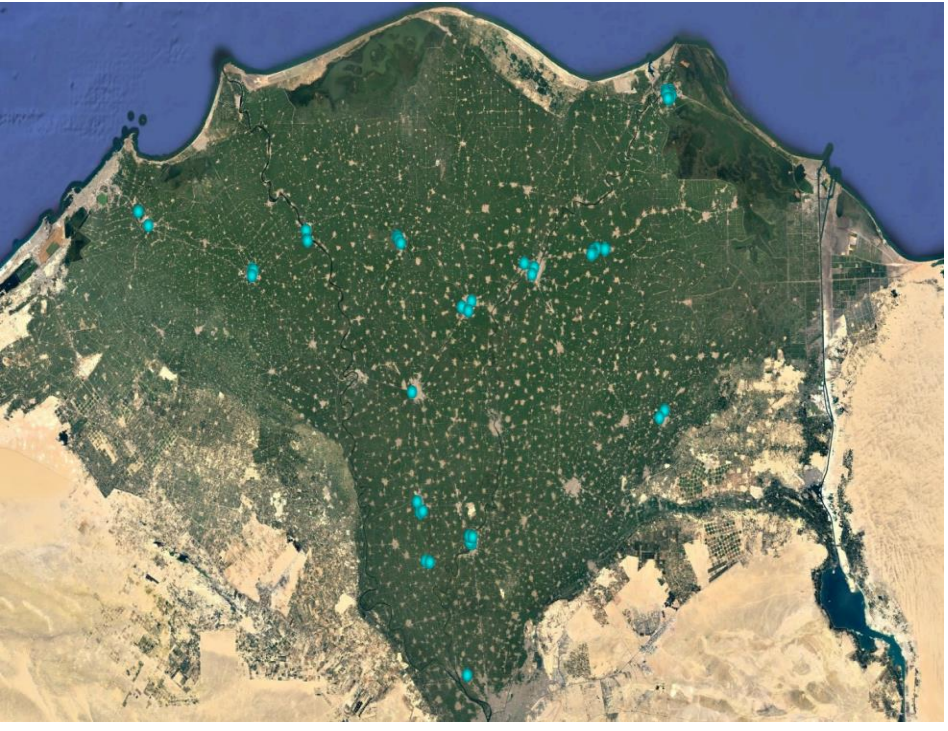
we



- 3G Quality
- 4G Quality
- core network
- CSFB Issue
- Mobility Issue
- No Service
- Other
- RAN Issue

All Operators: Blocked Calls Locations 1/2

vodafone



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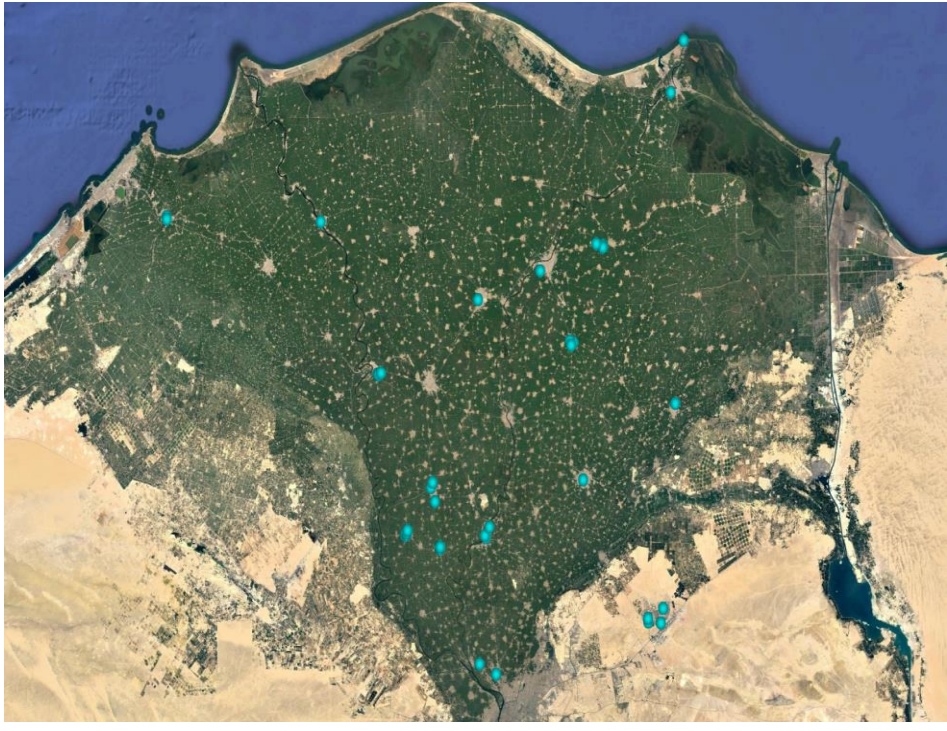
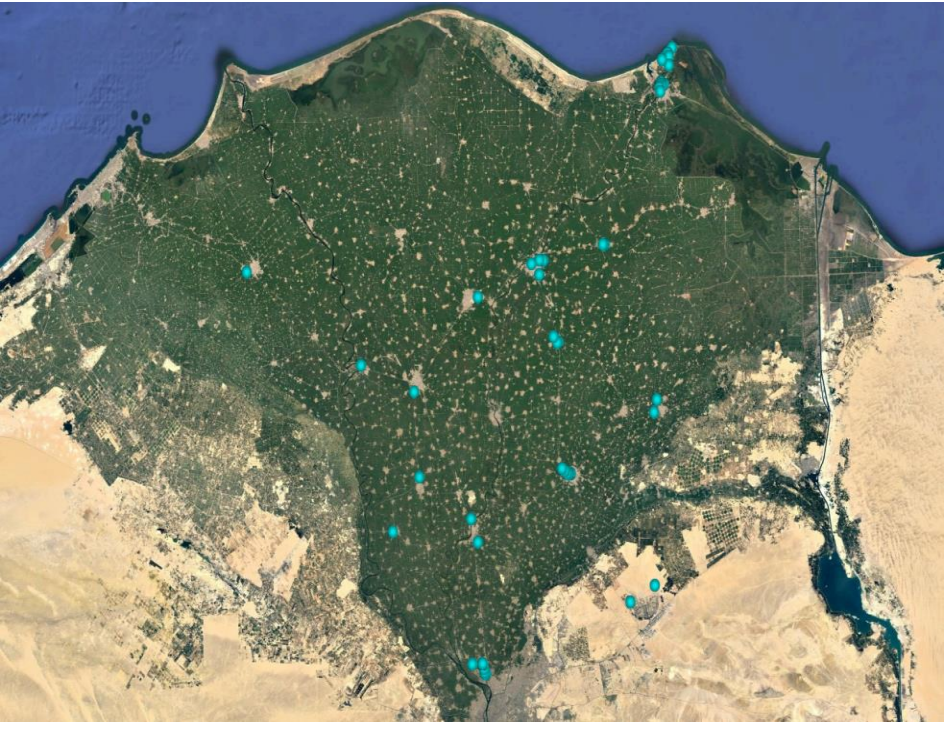


All Operators: Blocked Calls Locations 2/2

etisalat



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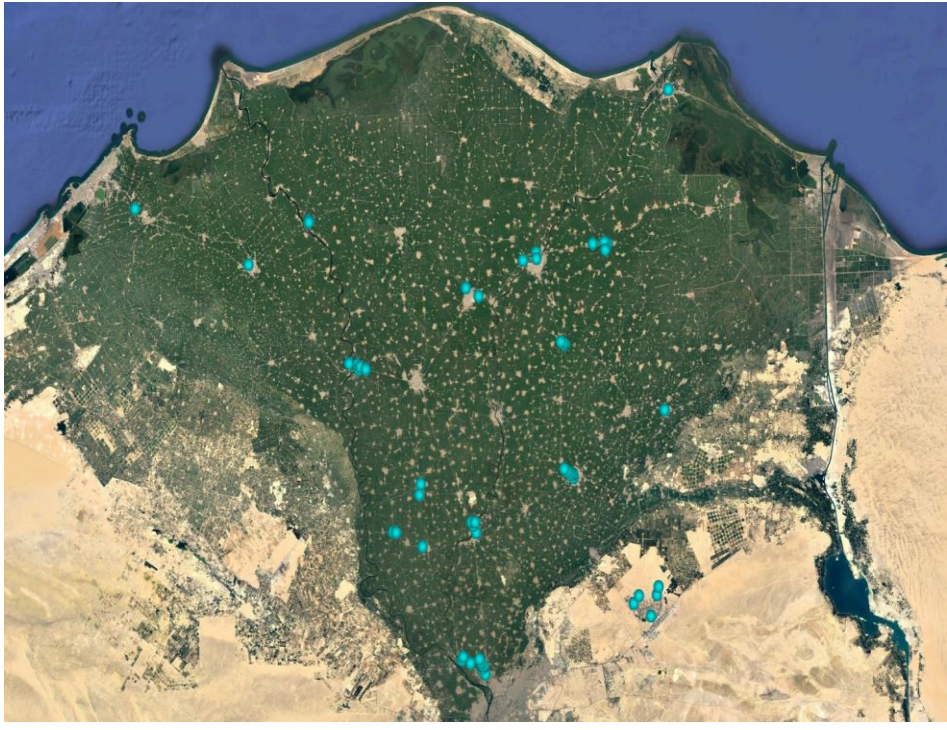


Agenda

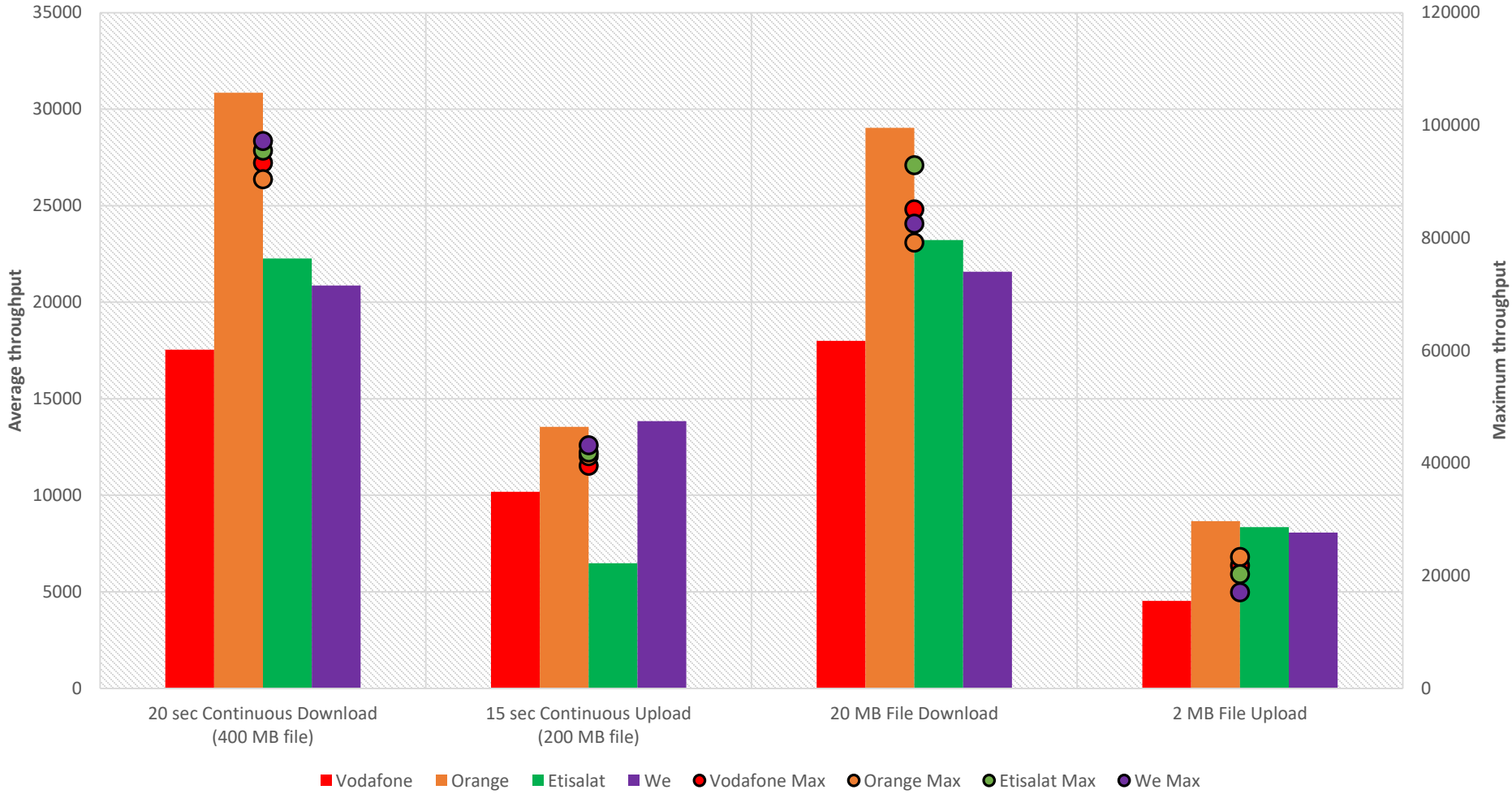
1. *Quantitative Information*
2. *Voice Service Quality & Performance - Cairo*
3. *Data Service Quality & Performance – Cairo*
4. *Voice Service Quality & Performance - Giza*
5. *Data Service Quality & Performance – Giza*
6. *Voice Service Quality & Performance - Alexandria*
7. *Data Service Quality & Performance - Alexandria*
8. *Voice Service Quality & Performance - Delta*
9. ***Data Service Quality & Performance – Delta***
10. *Voice Service Quality & Performance – Upper Egypt*
11. *Data Service Quality & Performance – Upper Egypt*
12. *Annexes*

Data Service KPI’s

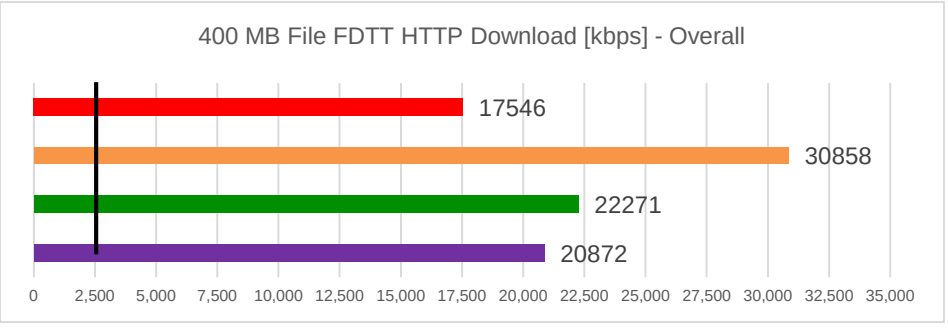
Free Mode Throughput Per Test Type

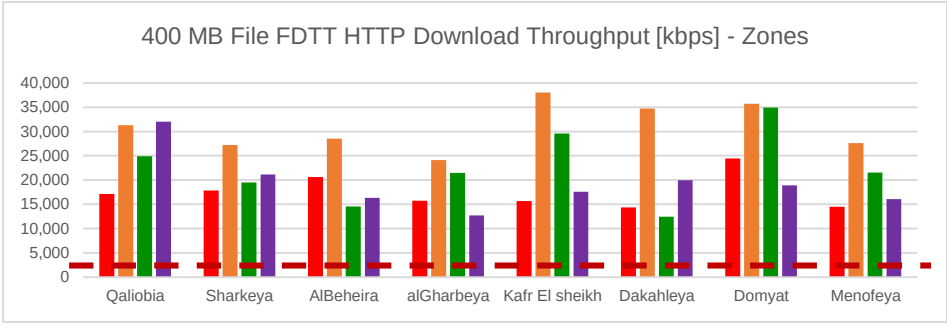
NETWORK PERFORMANCE TEST

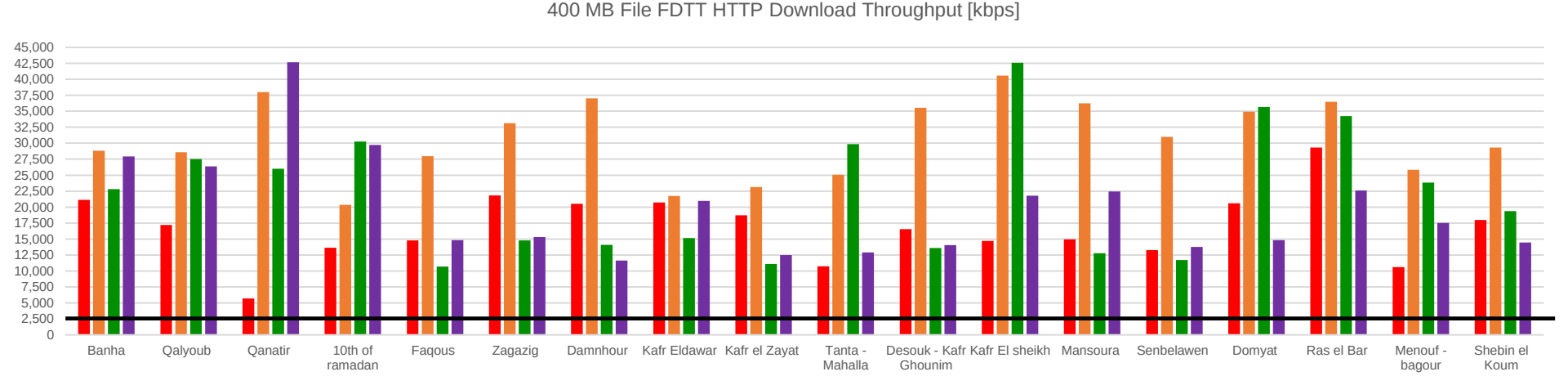
USER EXPERIENCE TEST



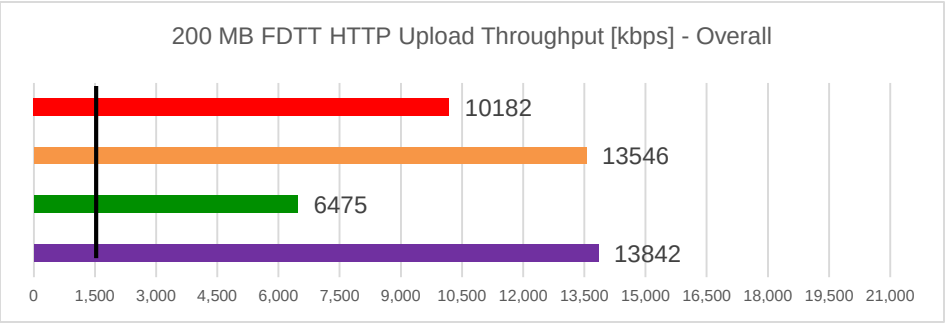
FDTT HTTP Download Transfer Throughput – Network Performance

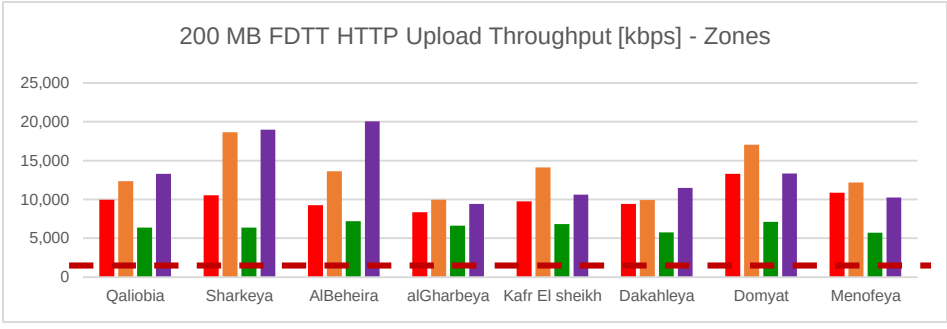


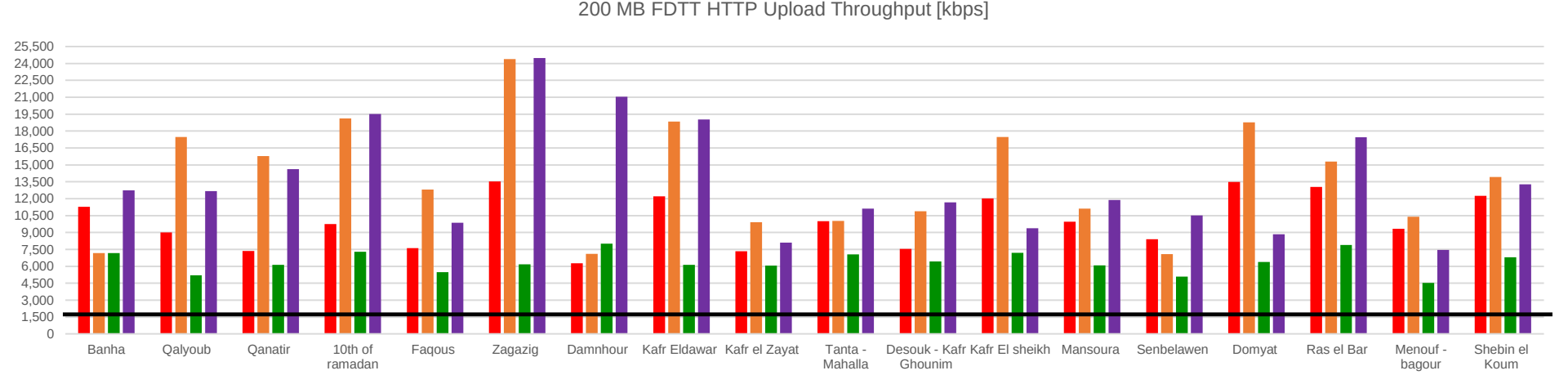




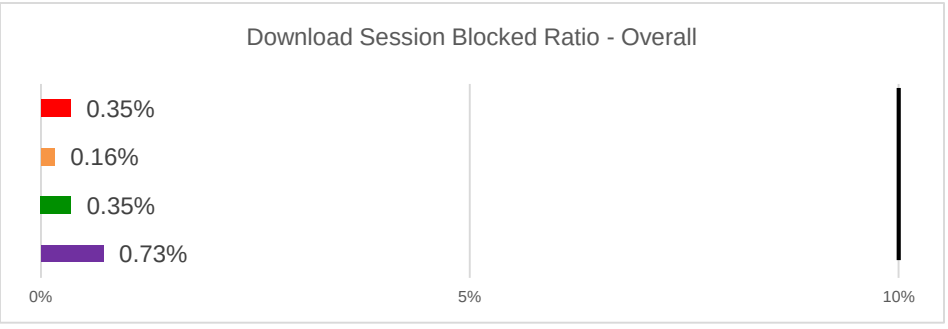
FDTT HTTP Upload Transfer Throughput – Network Performance

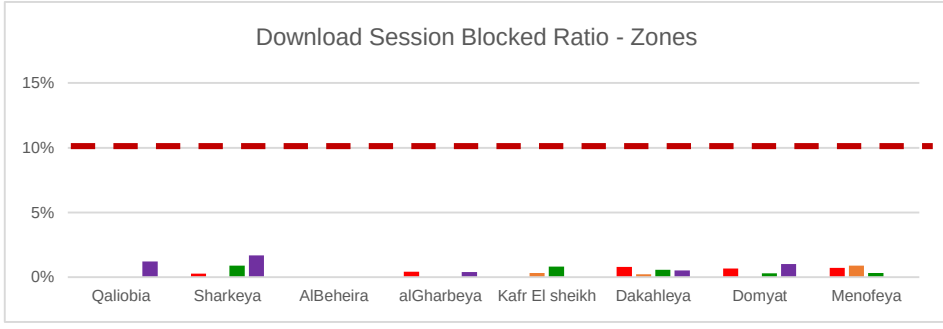


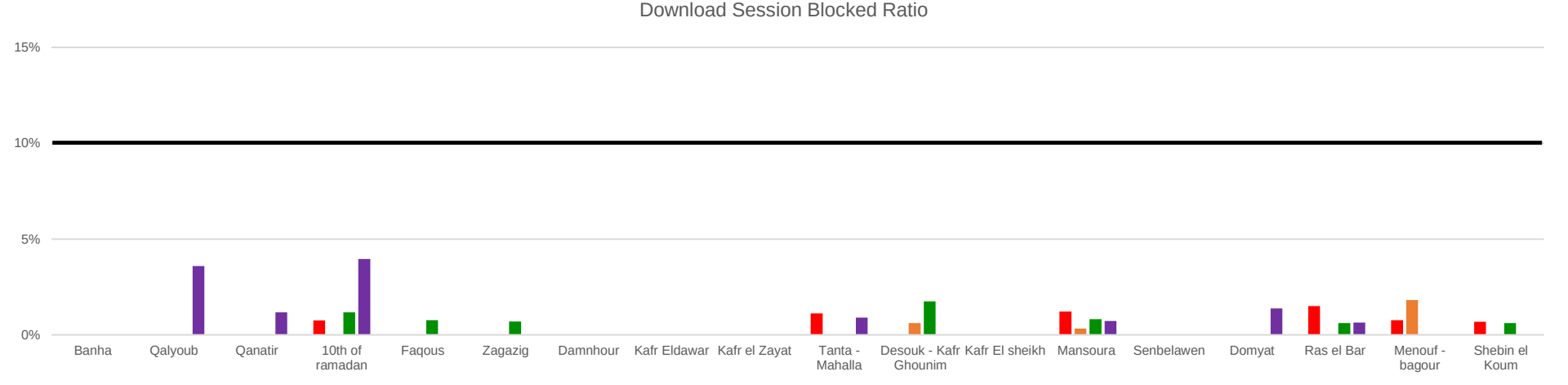




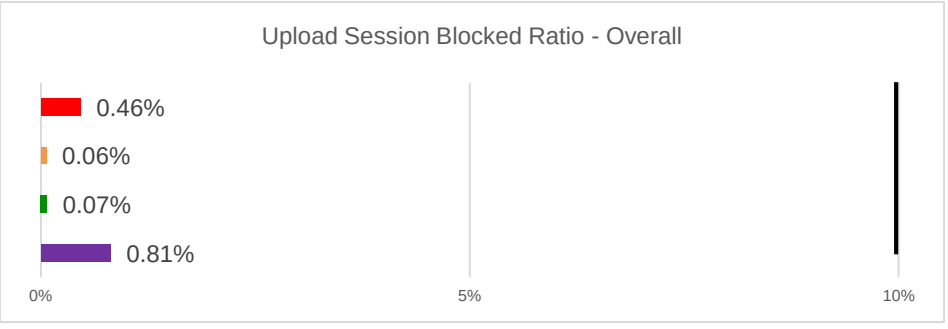
HTTP Download Session Blocked Rates

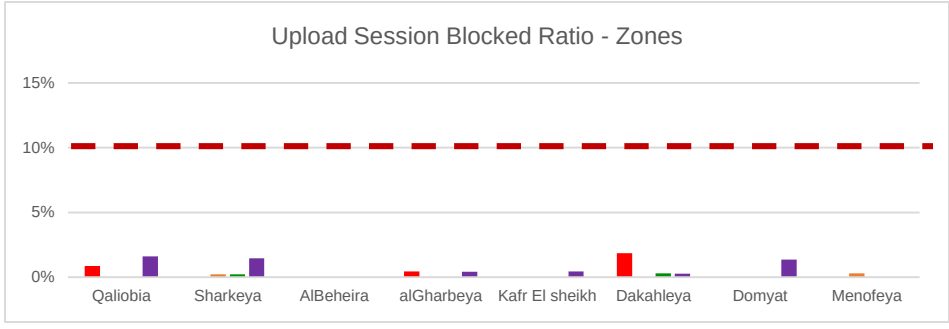


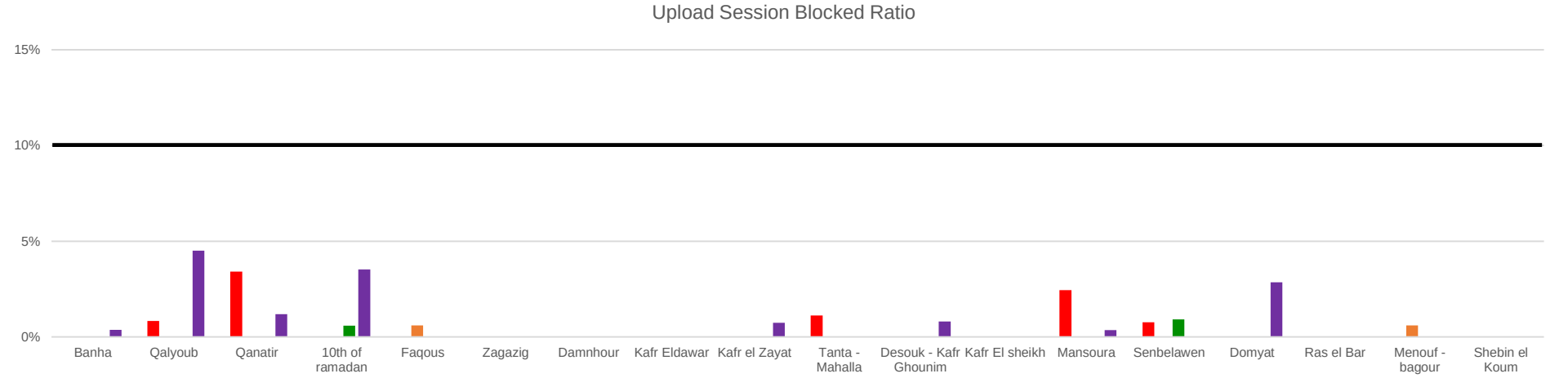




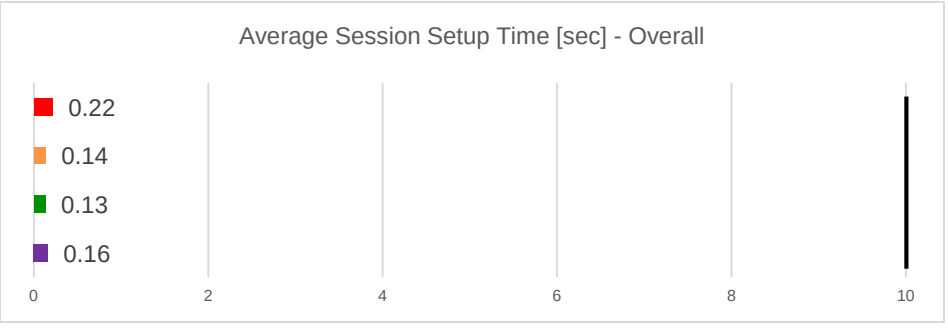
HTTP Upload Session Blocked Rates

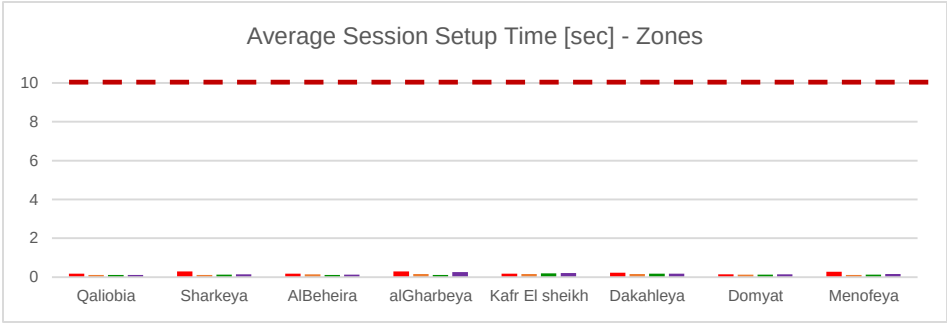


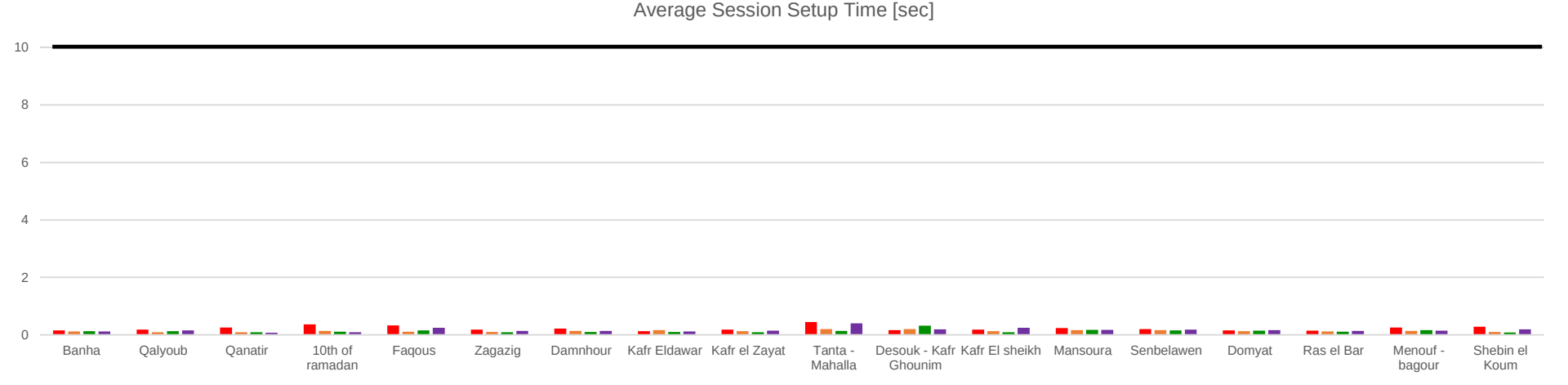




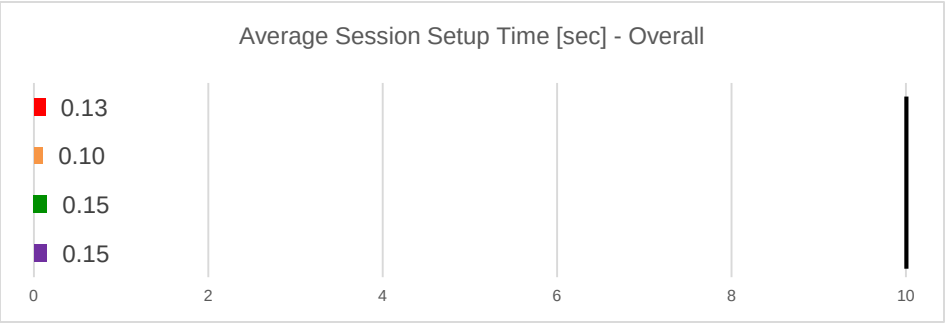
HTTP Download Average Session Setup Time

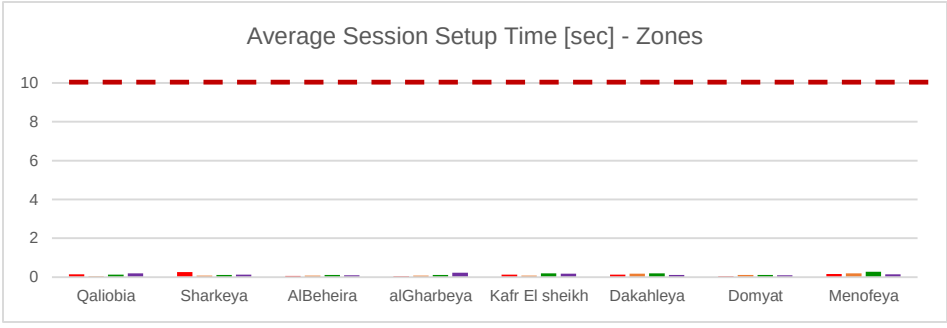


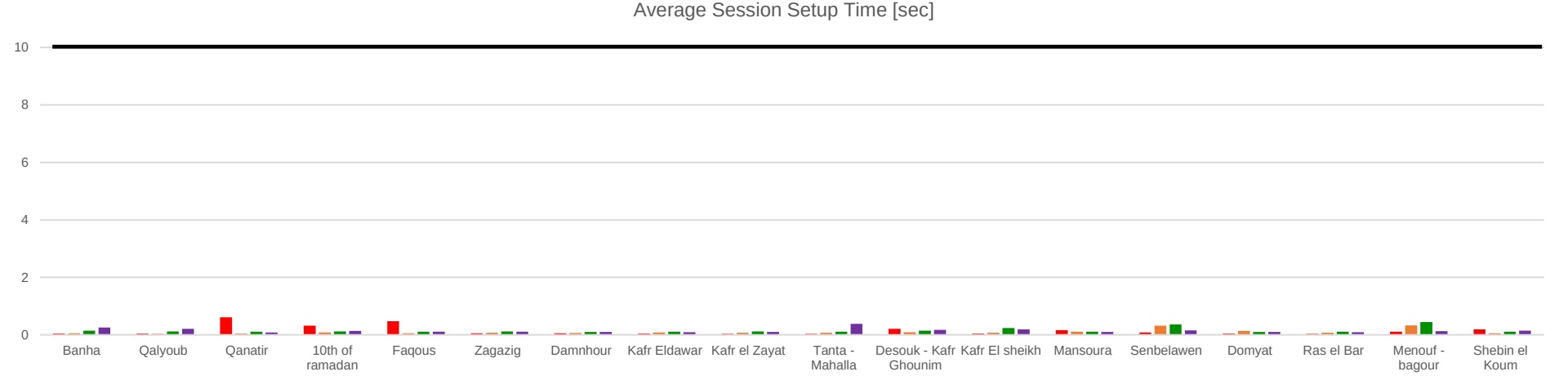




HTTP Upload Average Session Setup Time

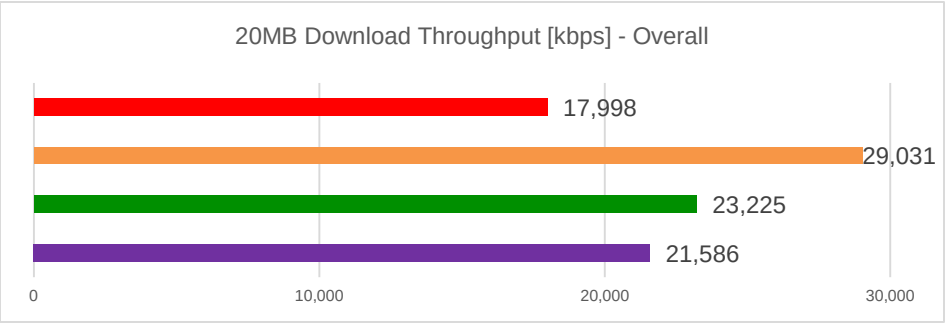


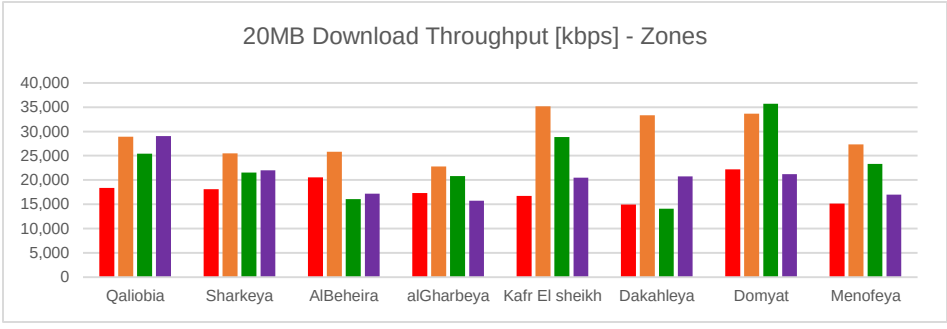


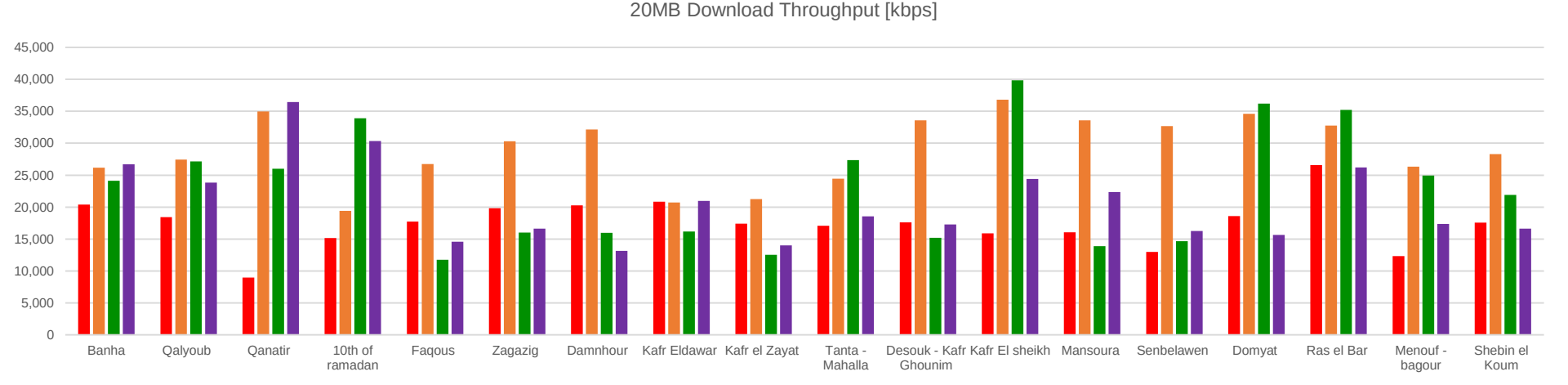


Throughput KPI’s – Customer Experience

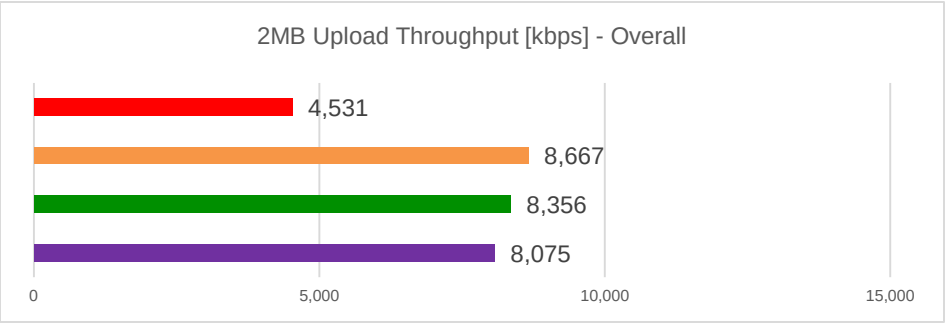
HTTP Download Throughput – Customer Experience

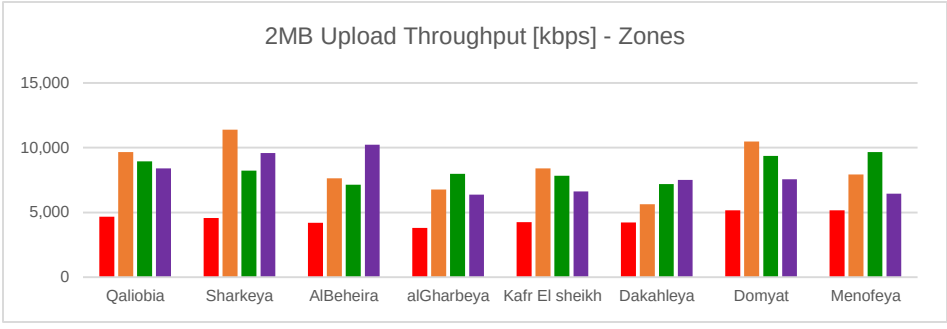


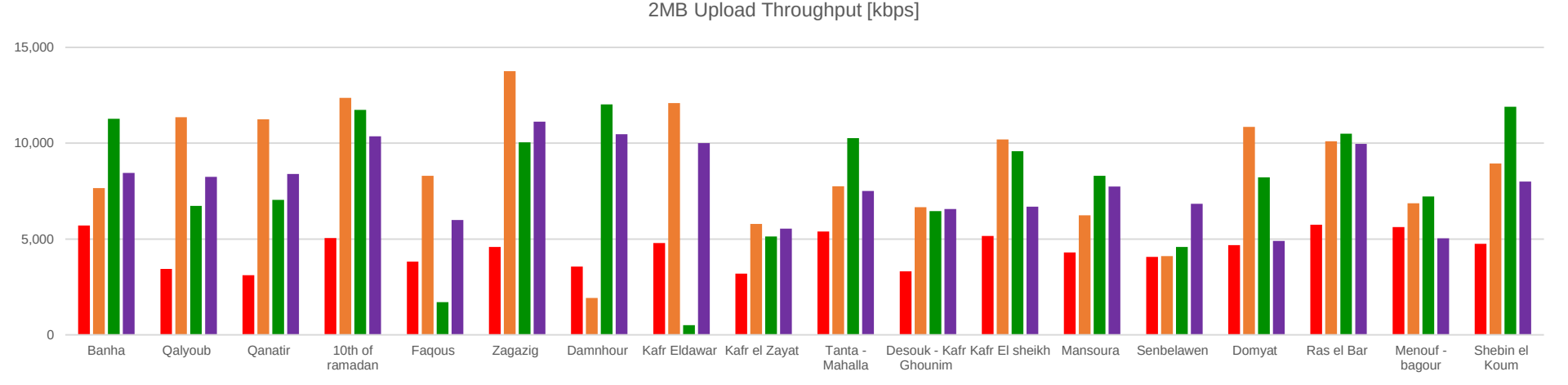


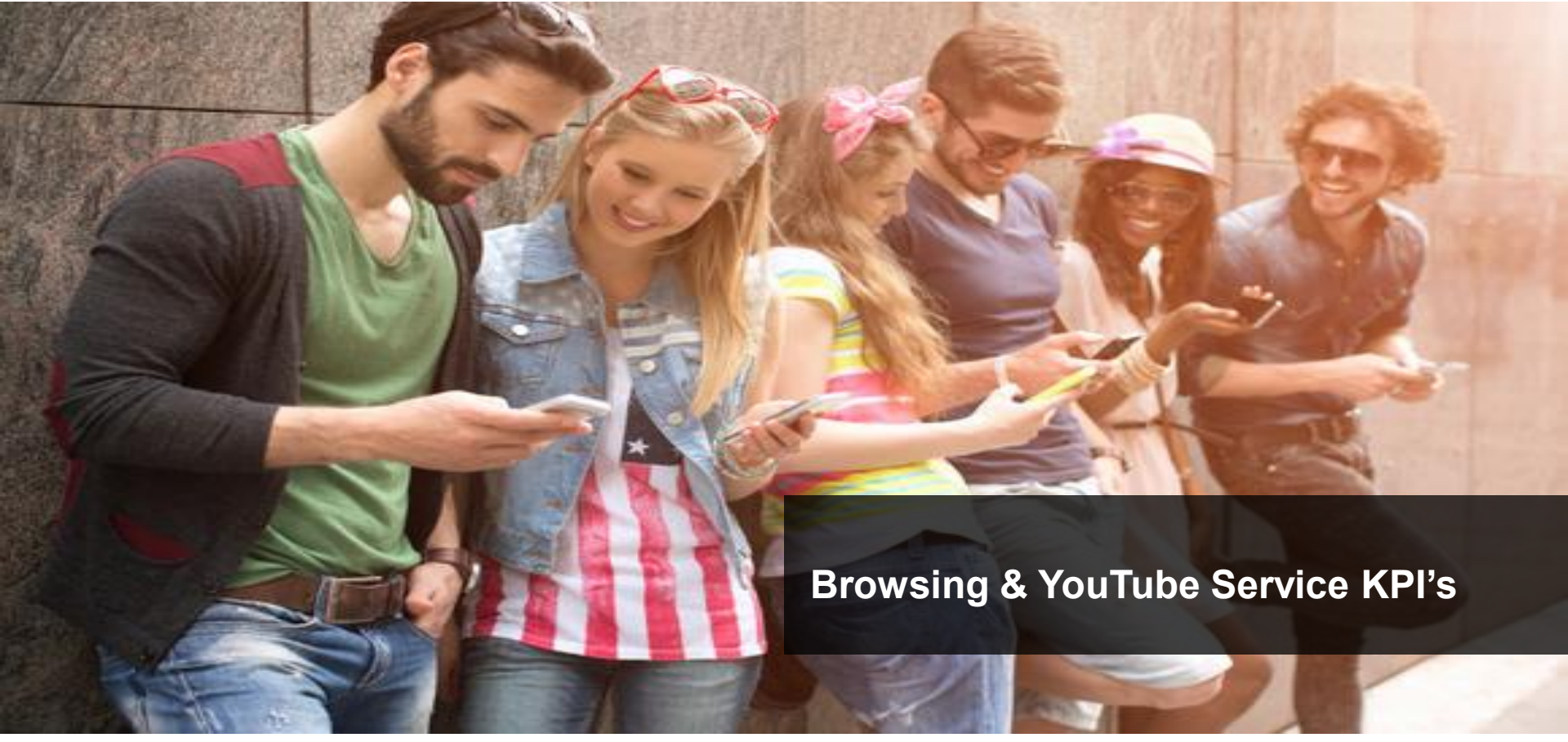


HTTP Upload Throughput – Customer Experience



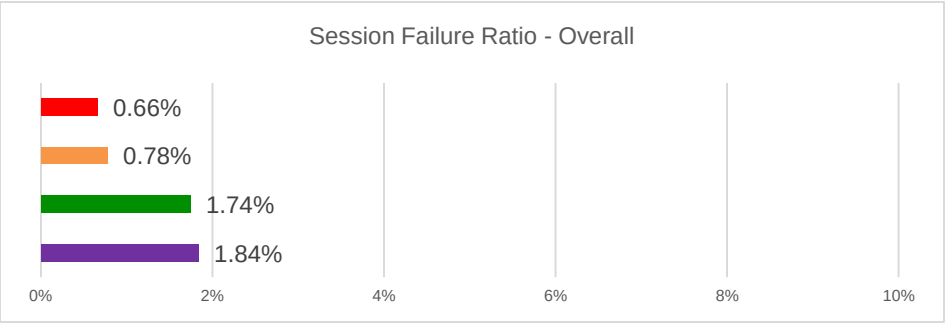


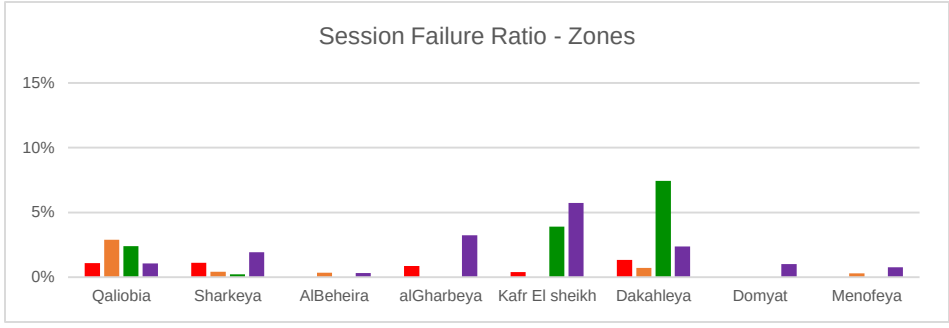


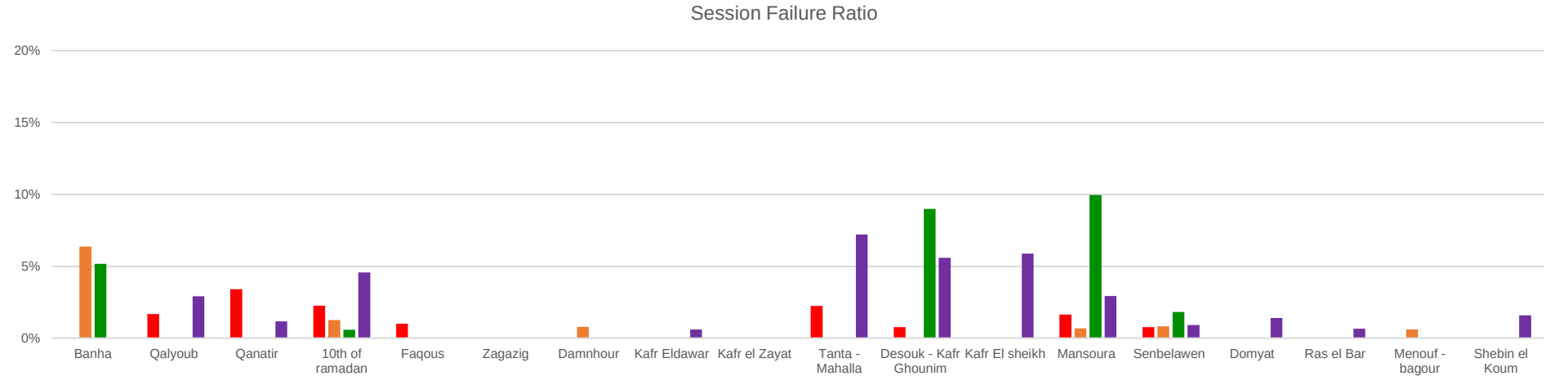


Browsing & YouTube Service KPI’s

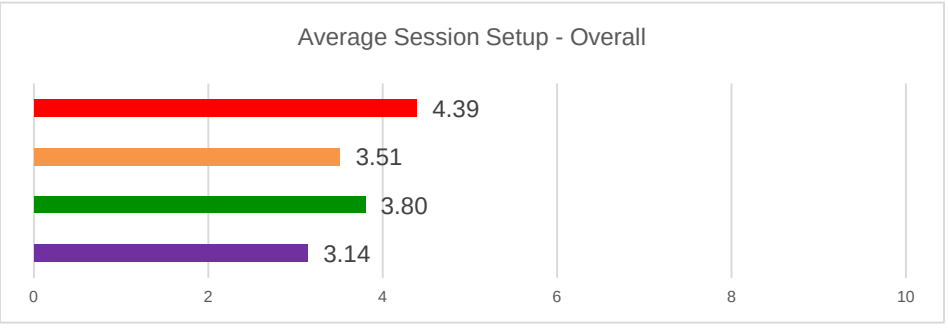
Session Failure Ratio

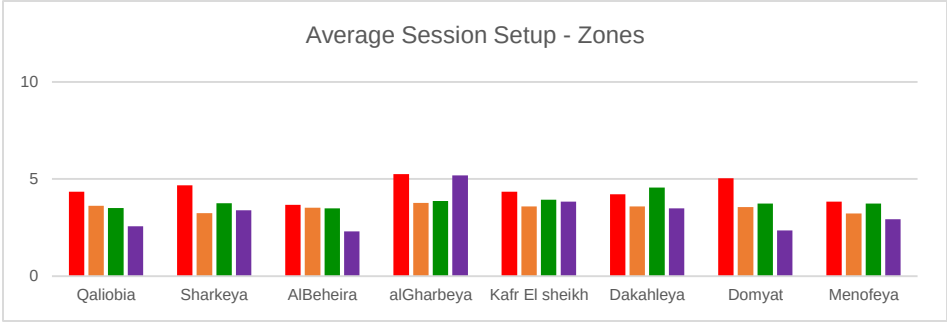


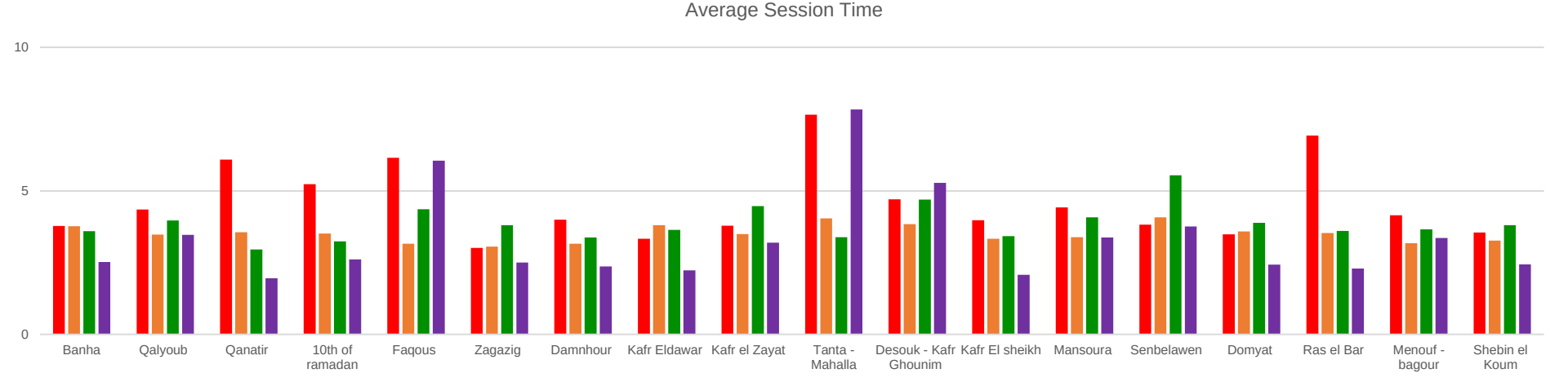




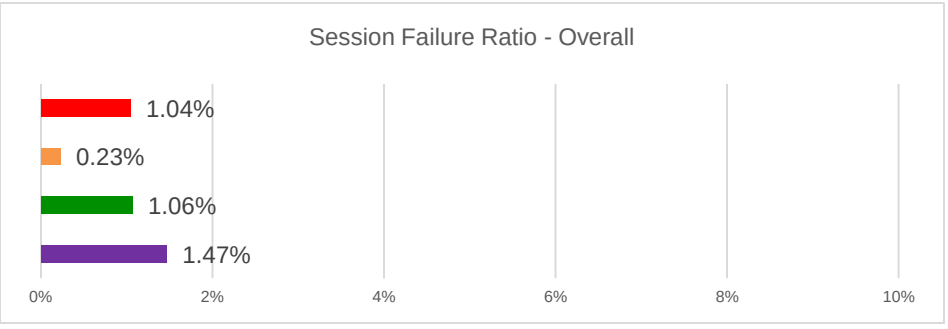
Session Time

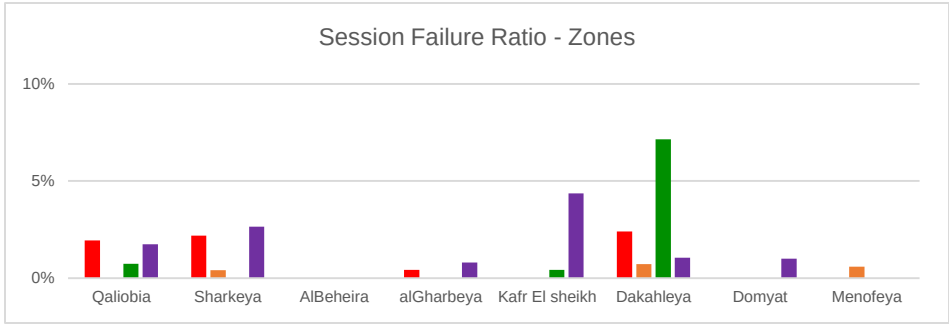


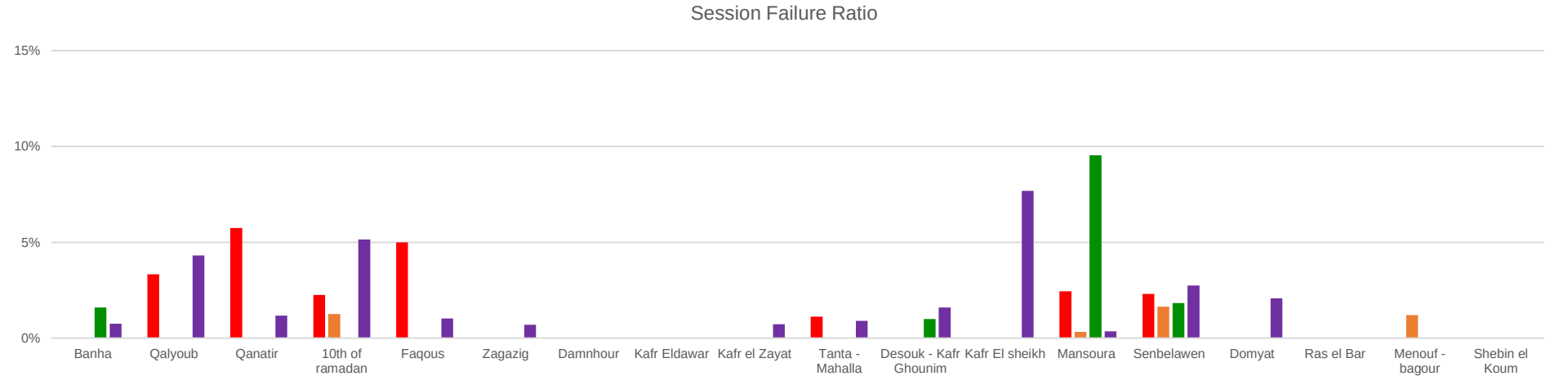




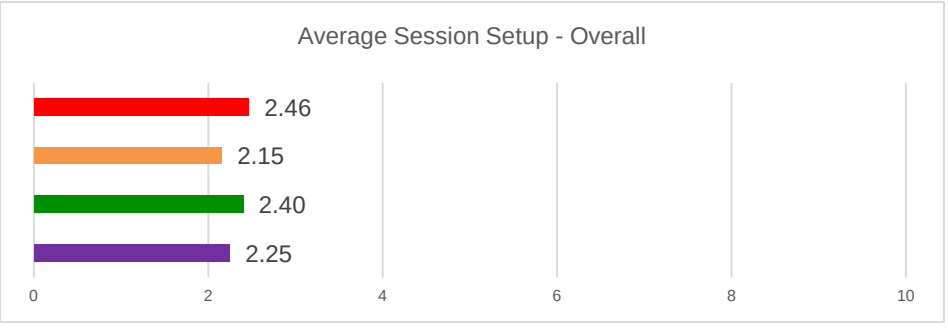
Google Session Failure Ratio

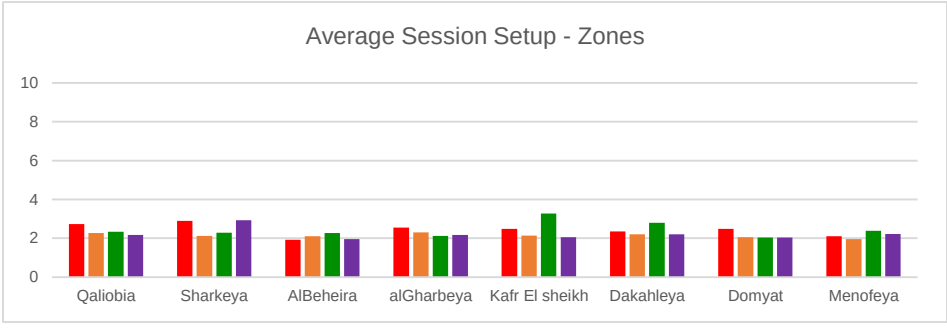


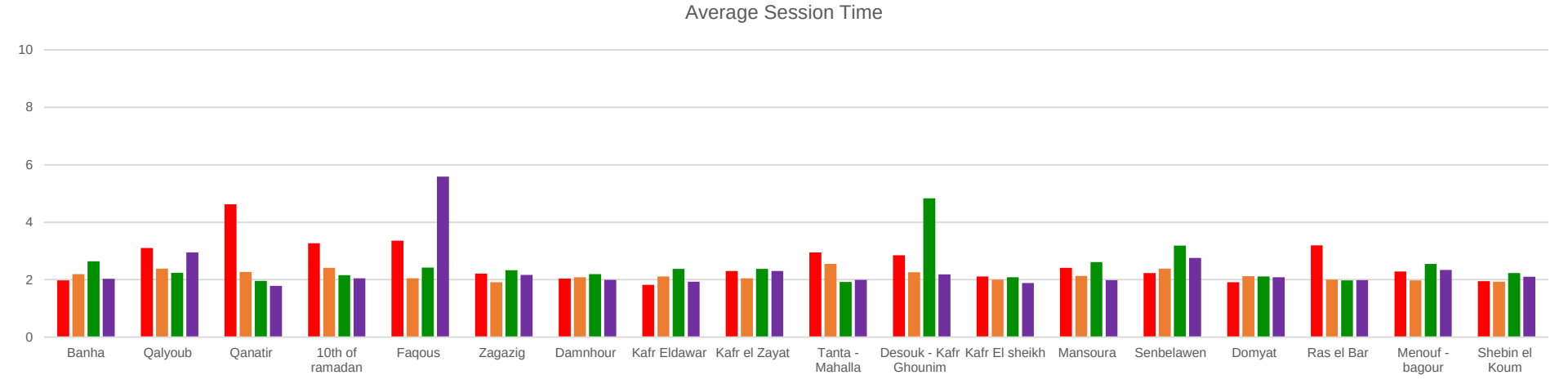




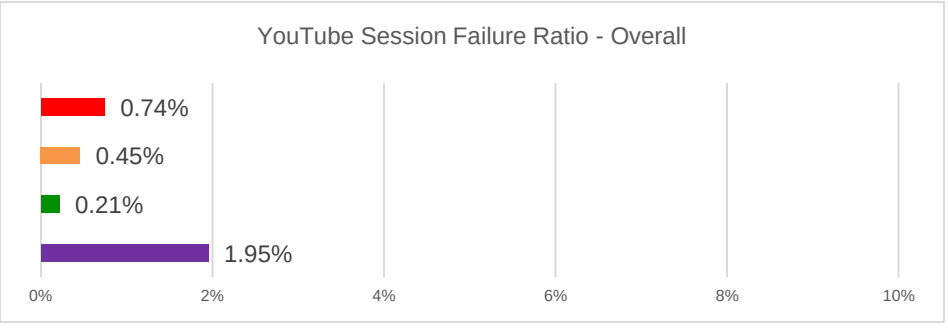
Google Session Time

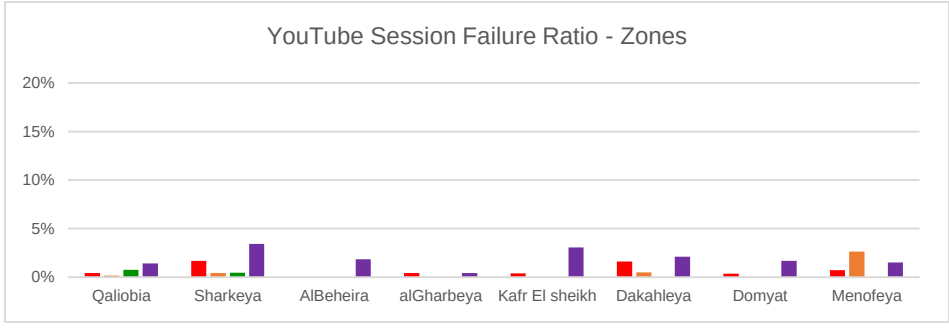


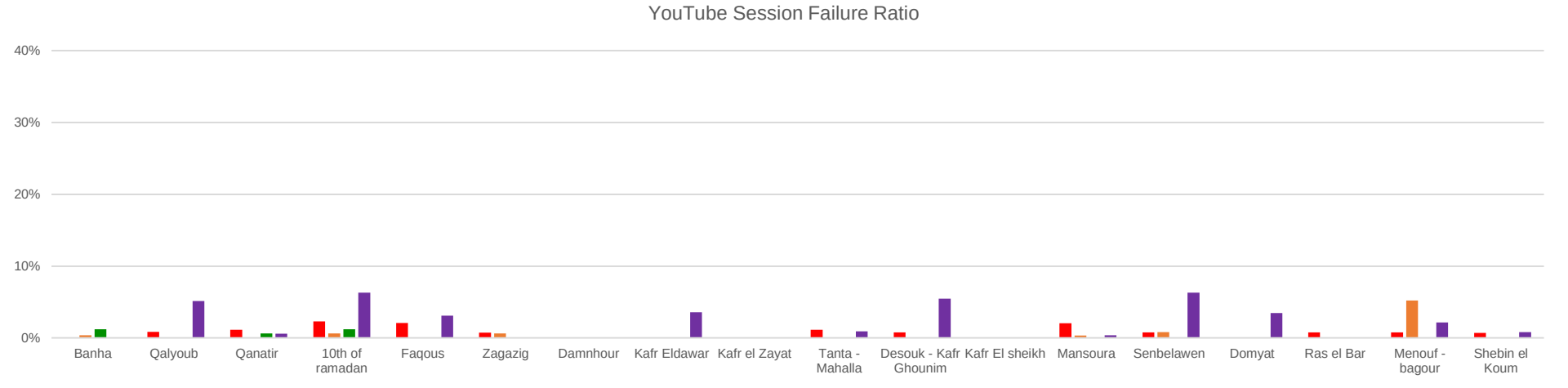




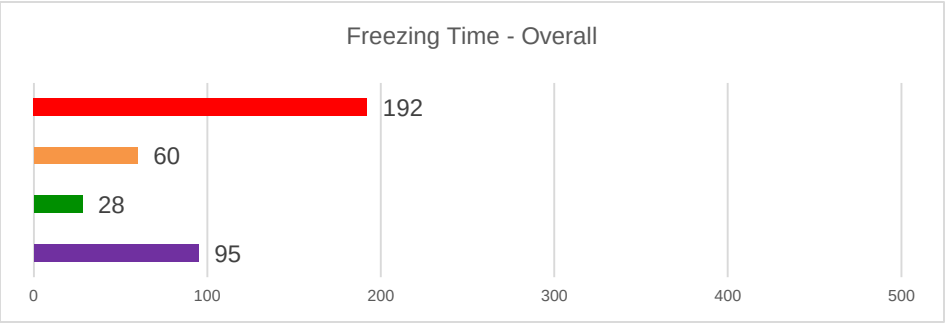
YouTube Session Failure Ratio

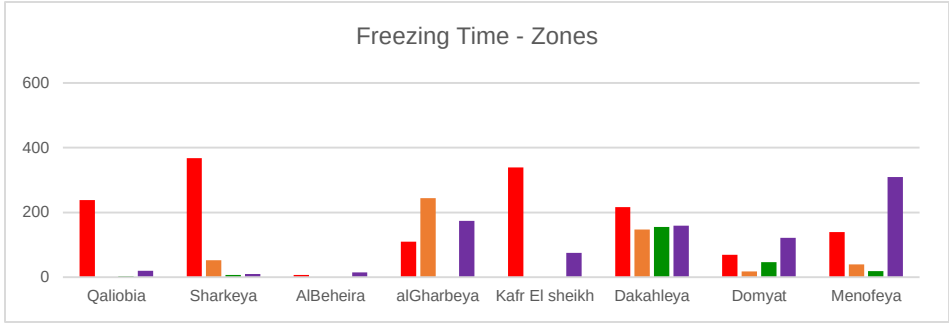


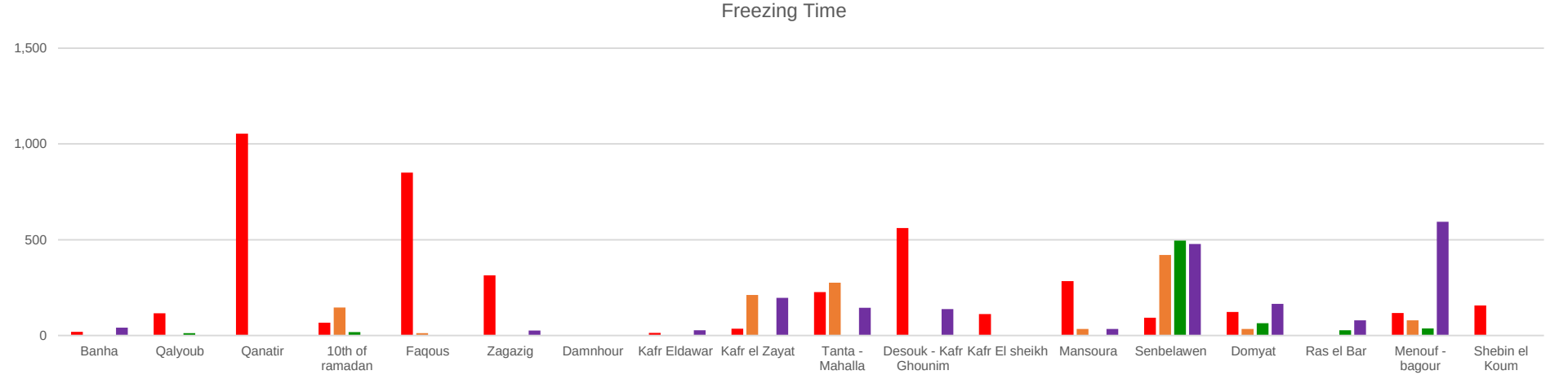




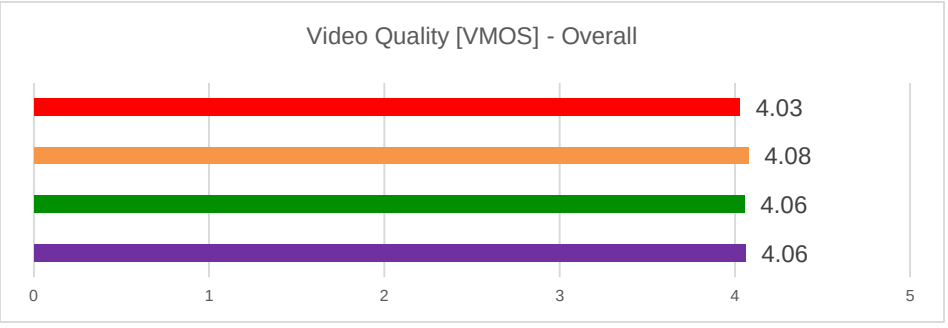
YouTube Freezing Time [msec]

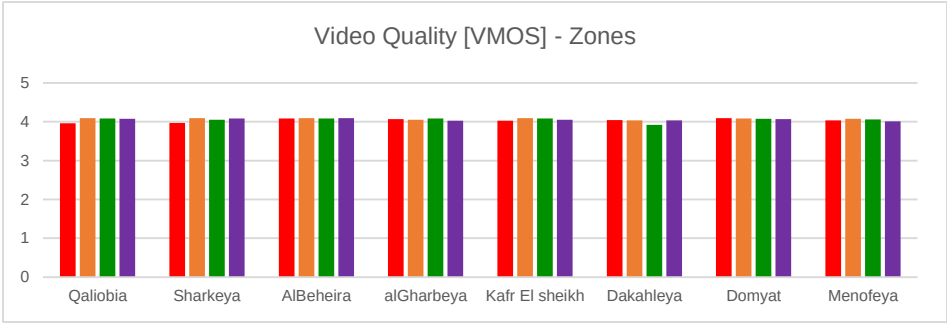


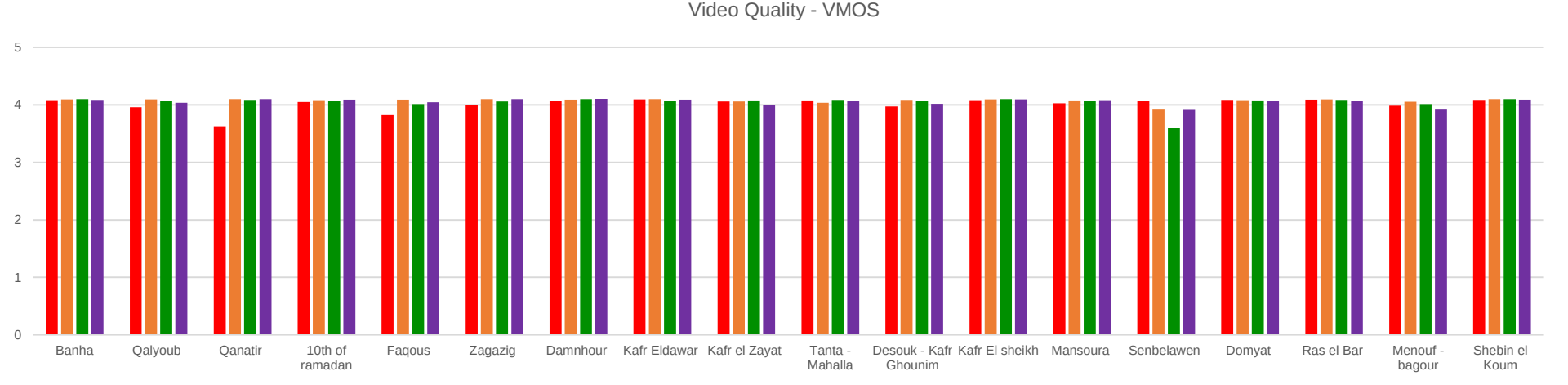




YouTube Video Quality







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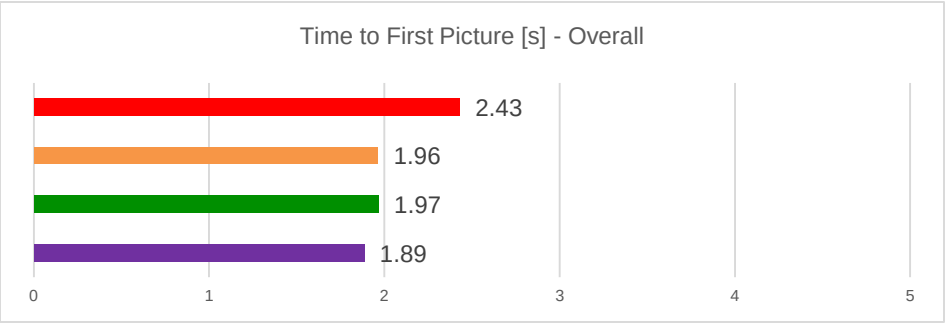
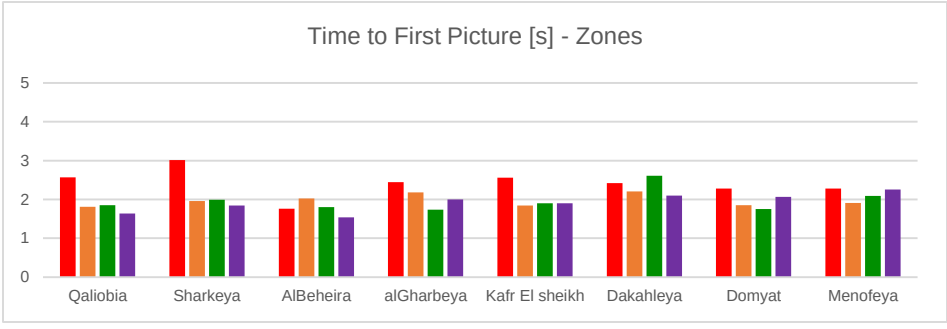
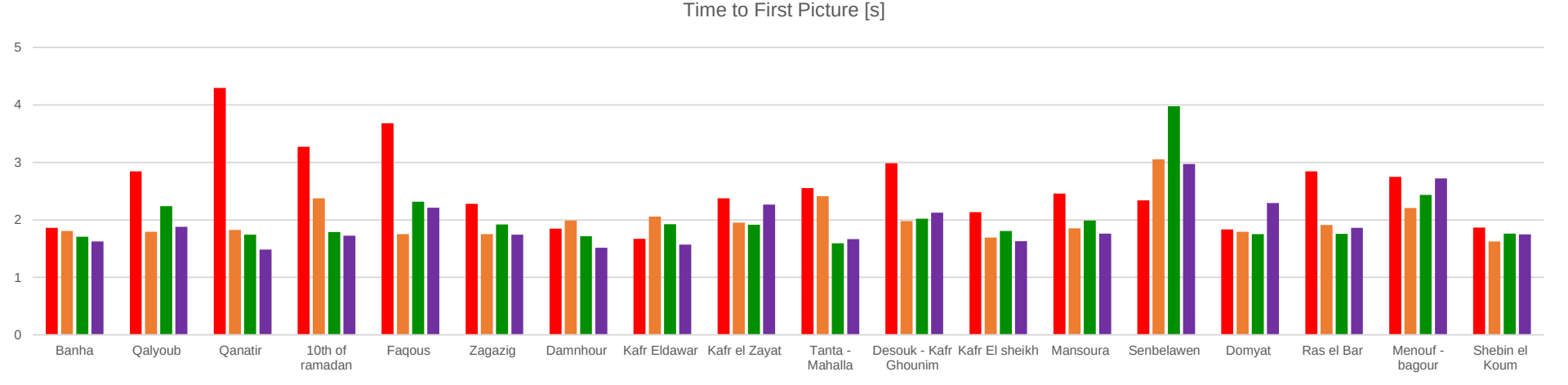
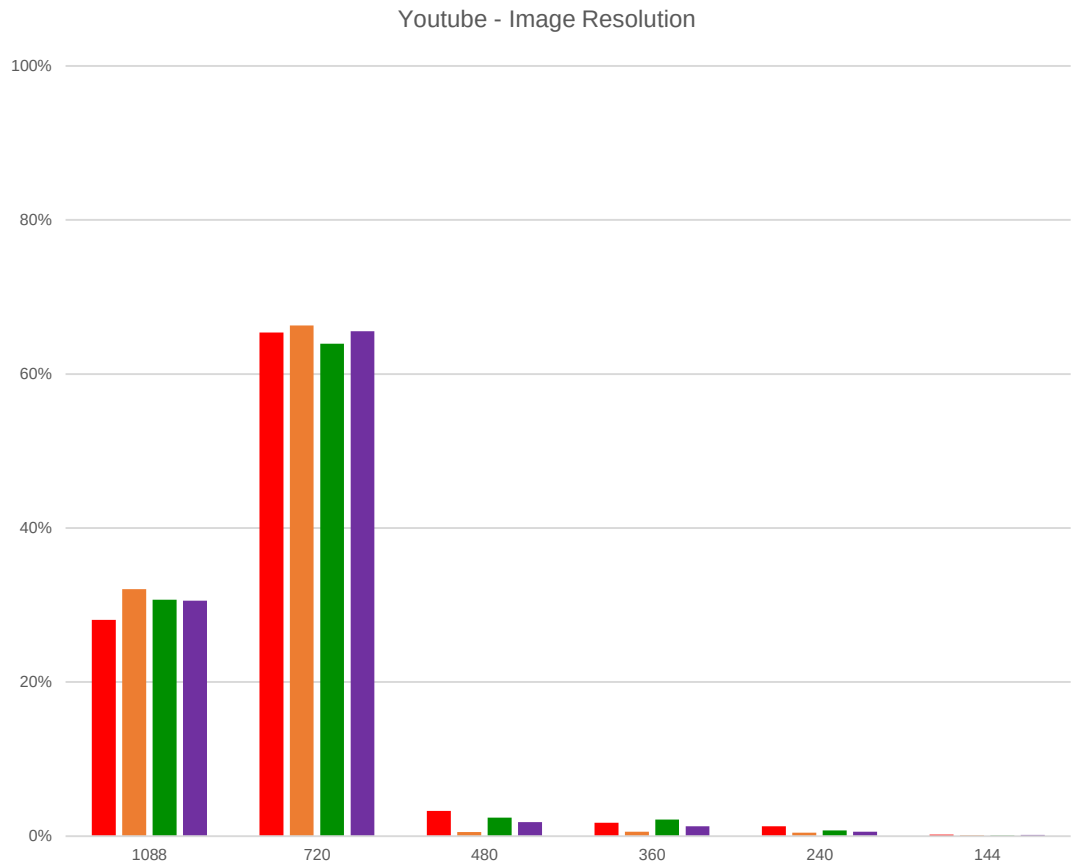






YouTube

Image Resolution



Agenda

1. *Quantitative Information*
2. *Voice Service Quality & Performance - Cairo*
3. *Data Service Quality & Performance – Cairo*
4. *Voice Service Quality & Performance - Giza*
5. *Data Service Quality & Performance – Giza*
6. *Voice Service Quality & Performance - Alexandria*
7. *Data Service Quality & Performance - Alexandria*
8. *Voice Service Quality & Performance - Delta*
9. *Data Service Quality & Performance – Delta*
10. ***Voice Service Quality & Performance – Upper Egypt***
11. *Data Service Quality & Performance – Upper Egypt*
12. *Annexes*

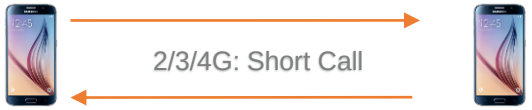
Zones Definition

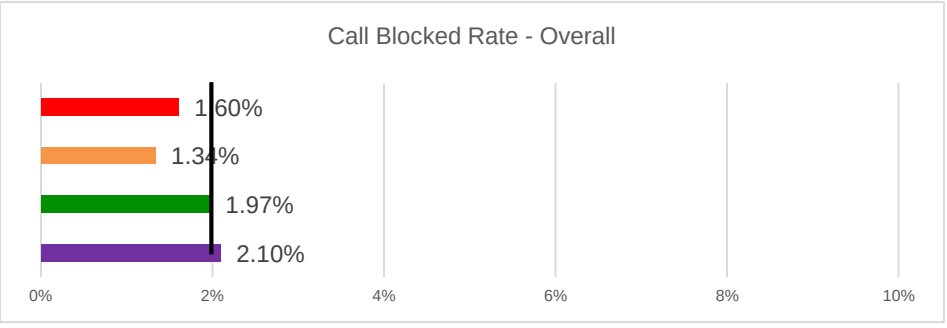
Upper Egypt

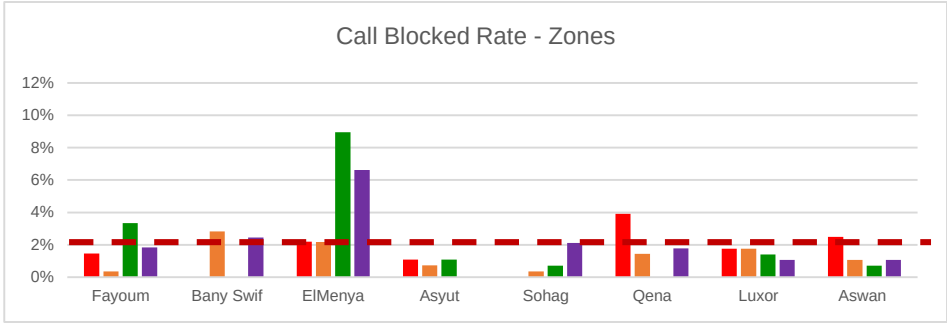
Upper Z1	Fayoum SinurisTirsa
upper Z2	BanySwif Wasta
Upper Z3	AbuQurqas Menya
Upper Z4	Asyut DayroutManfalout
Upper Z5	Sohag TahtaAkhmim
Upper Z7	Qena Nagaa
Upper Z8	Esna Luxor
Upper Z9	Aswan Abu Semble Komombo

Voice Service KPI’s

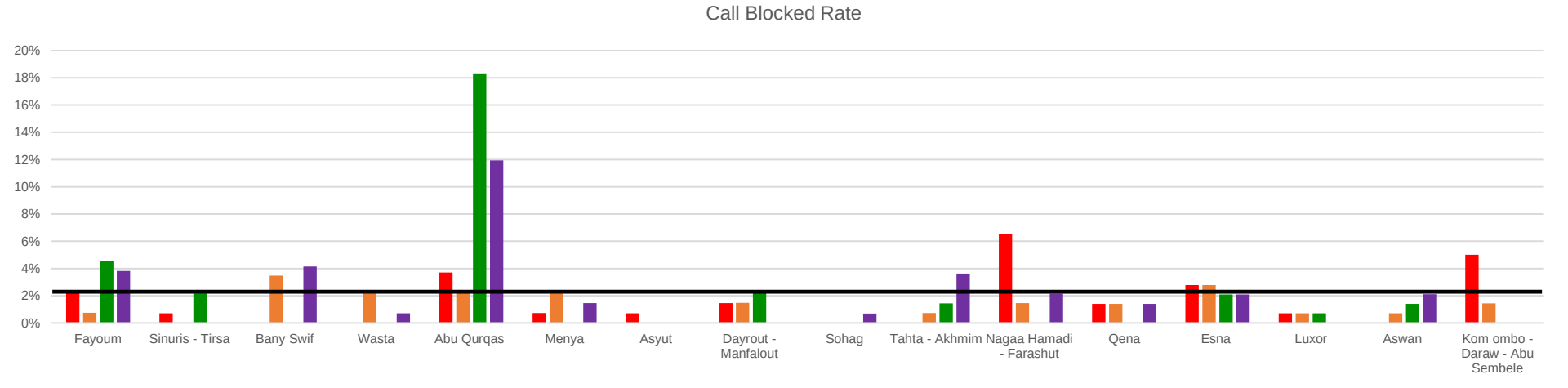
Accessibility: Call Blocked Rate



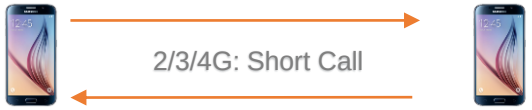


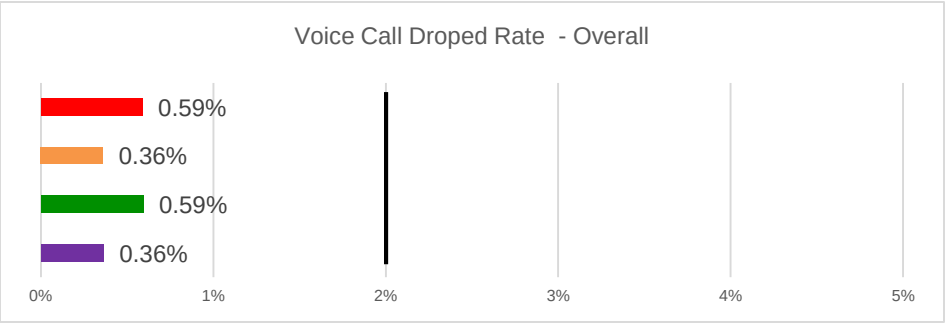


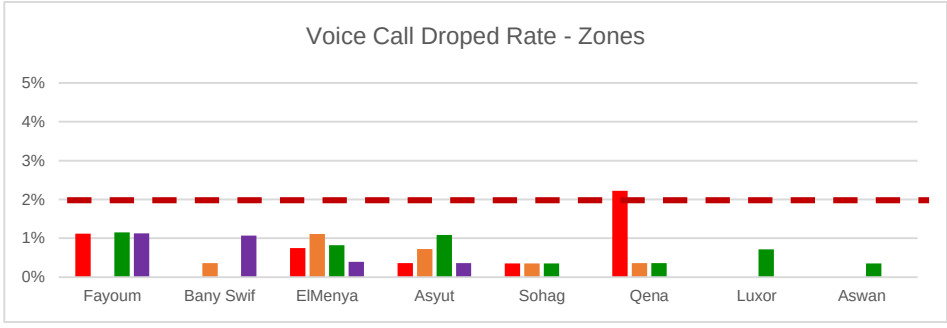
Call Blocked Calls *represents the ratio between unsuccessful call attempts and all calls made (both successful & unsuccessful).*



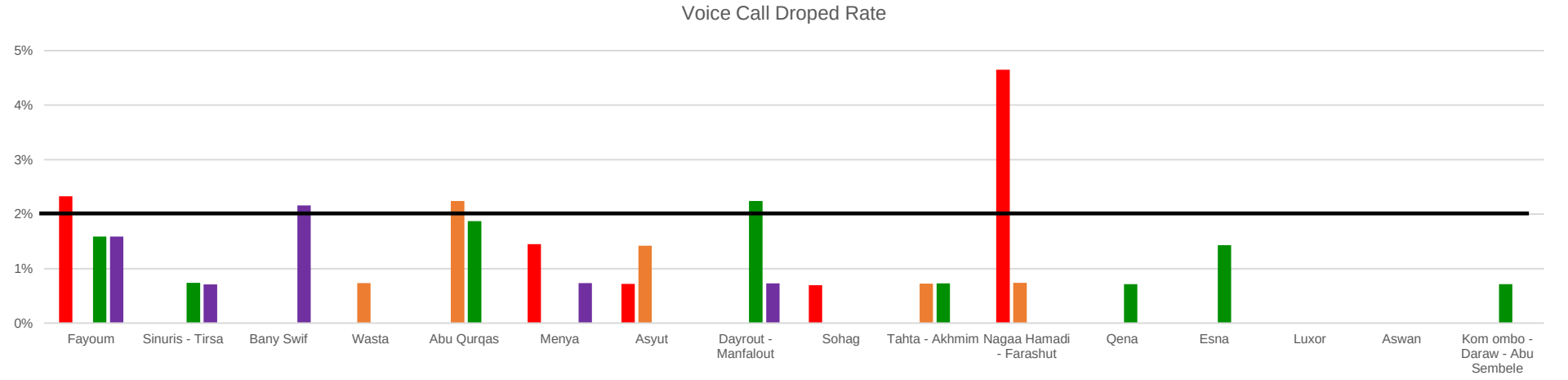
Retainability: Call Dropped Rate



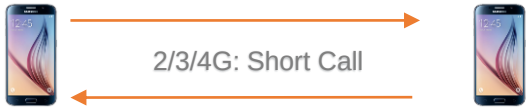


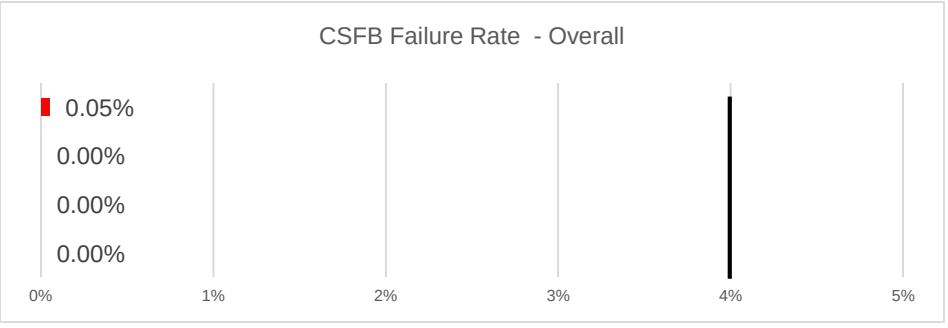


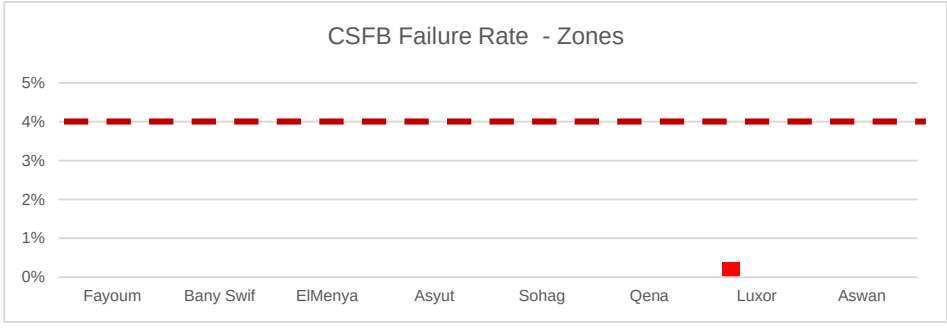
Voice Call Retainability *is represented by call drop rates.*



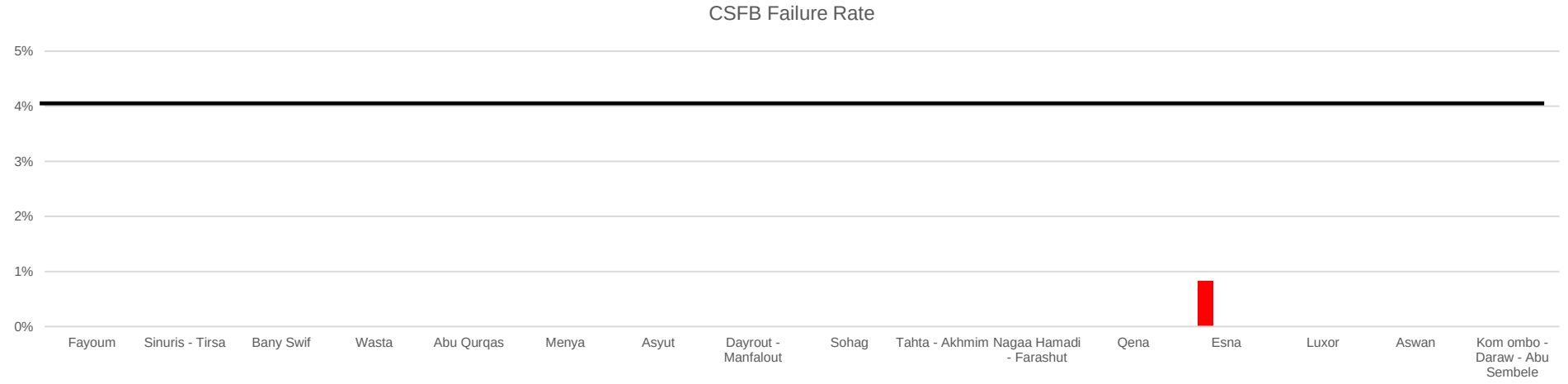
Accessibility: CSFB Failure Rate [%]



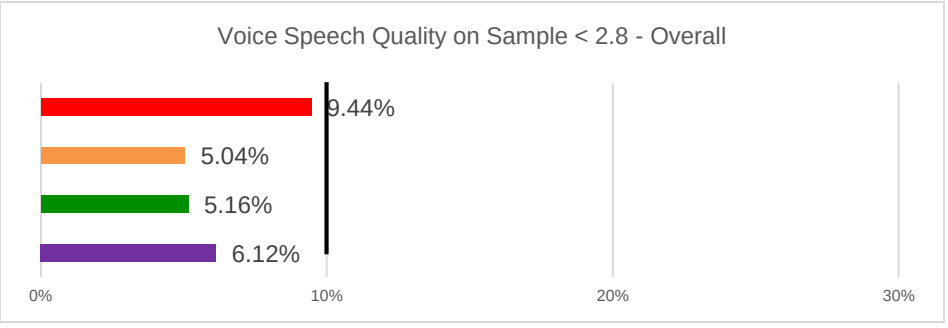


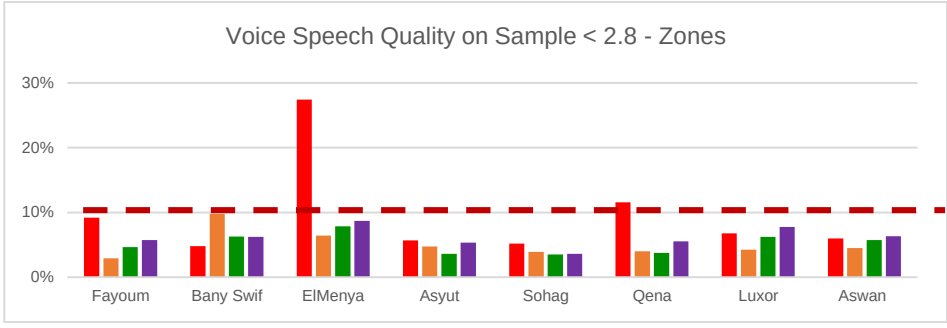


CSFB Failure Rate *represents the ratio between unsuccessful fall back attempt to lower technology than 4G (LTE) and all calls made (both successful & unsuccessful). When there is 4G (LTE) present before starting the session.*

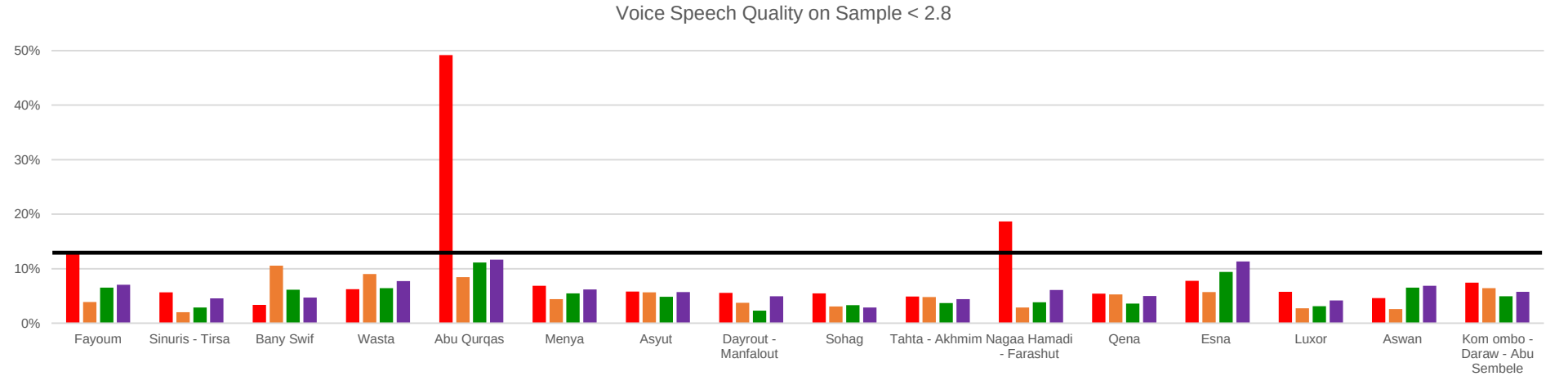


Speech Quality: MOS Voice Speech Quality < 2.8

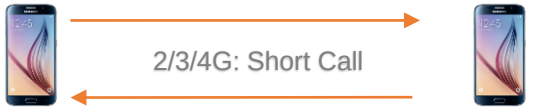


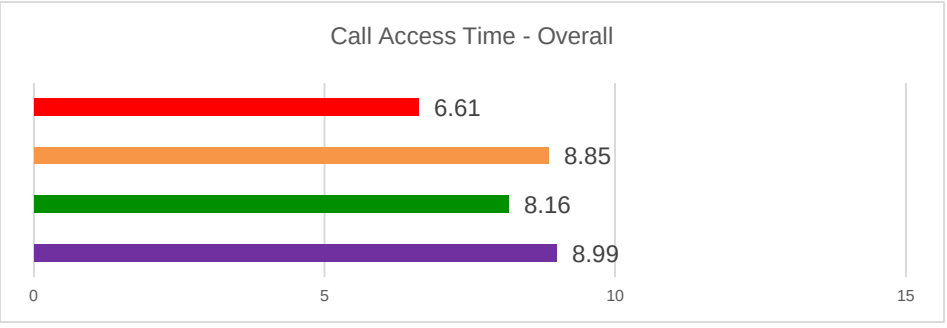


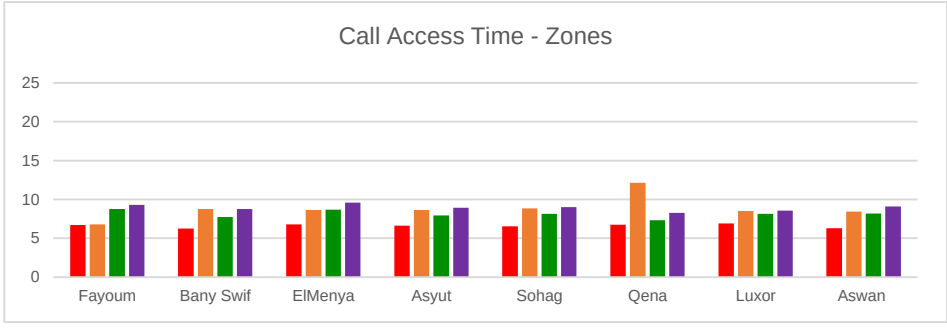
MOS Voice Speech Quality < 2.8 *represents the ratio between total number of MOS samples less than 2.8 all collected MOS samples*

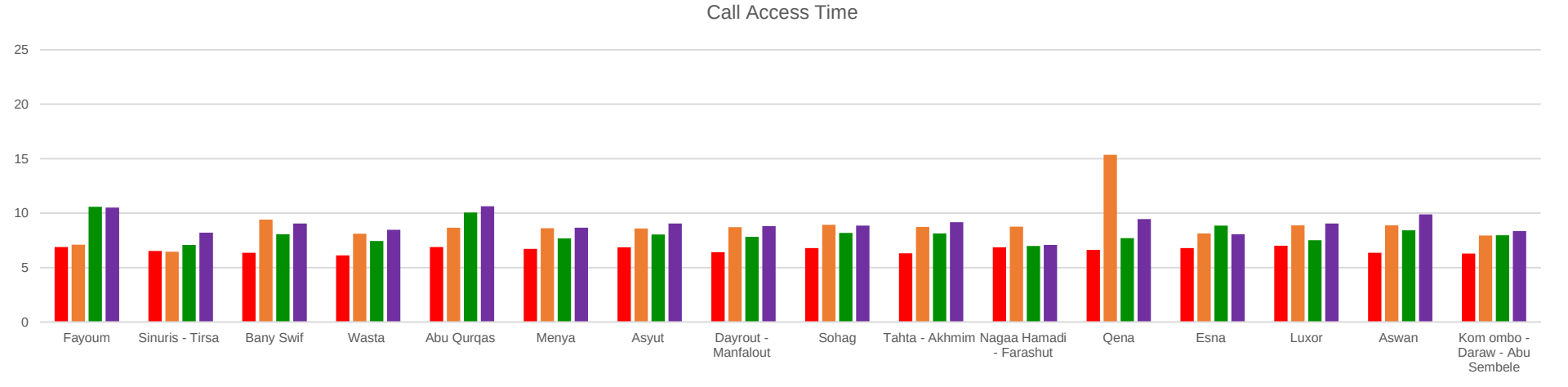


Accessibility: Call Access Time [sec.]

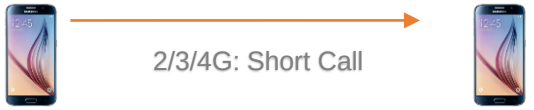


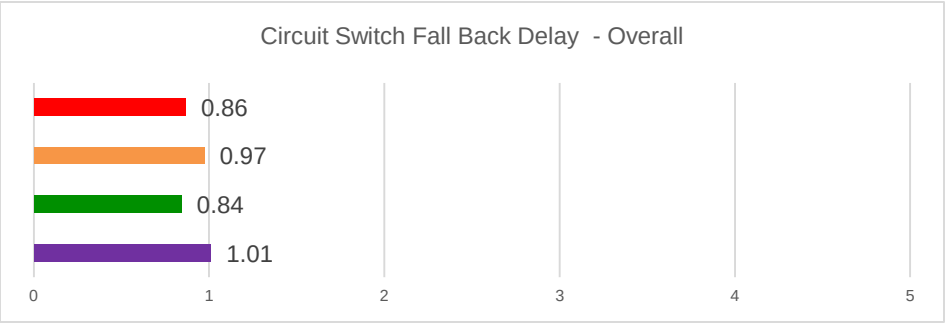


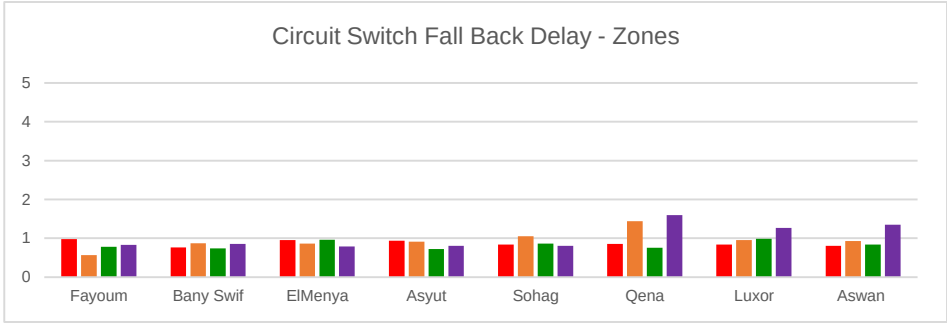


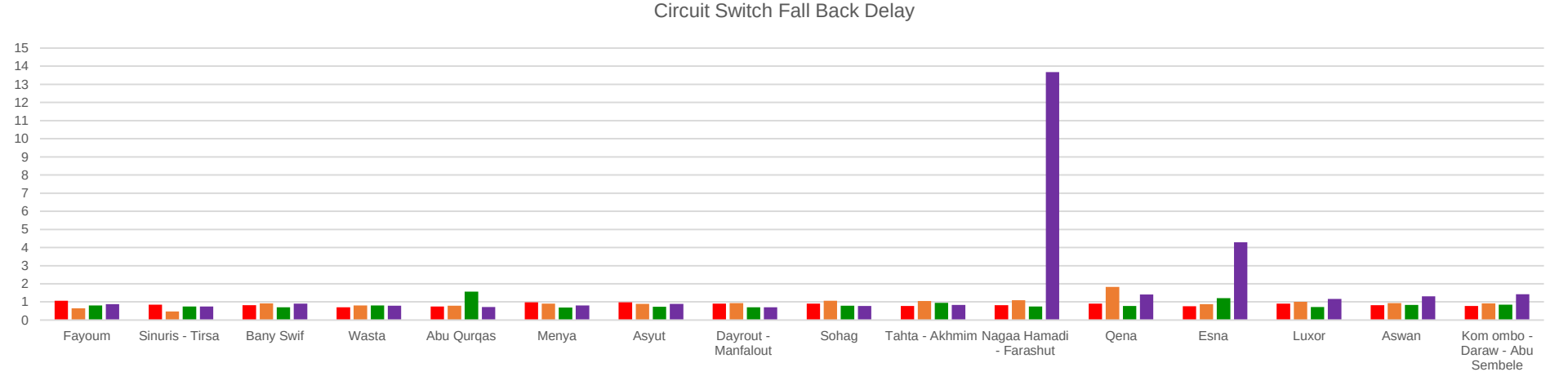


Accessibility: CSFB Delay [sec.]

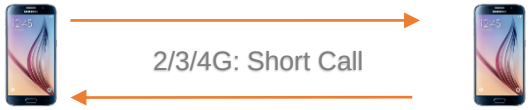


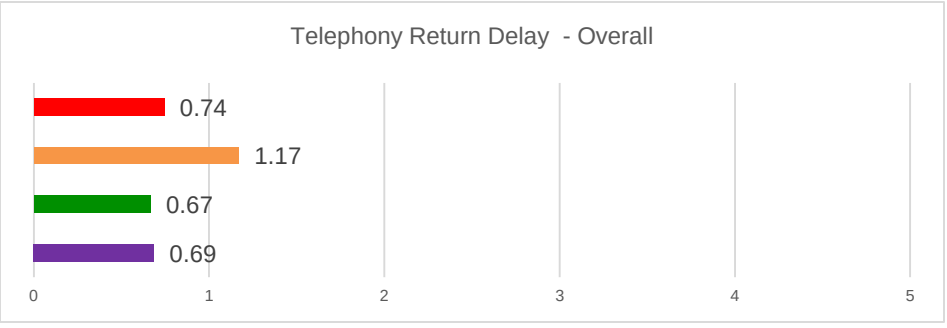


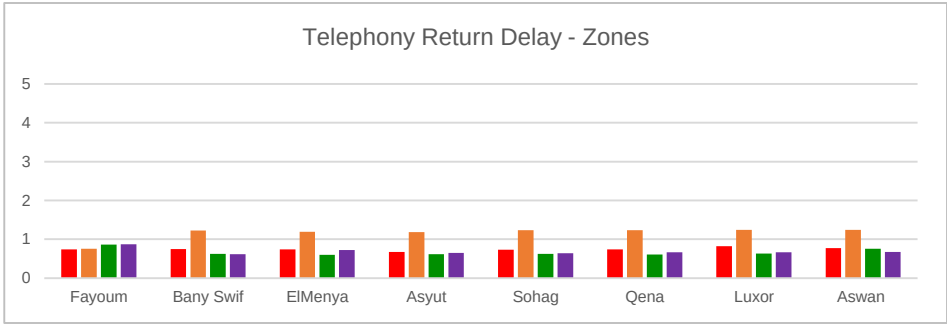




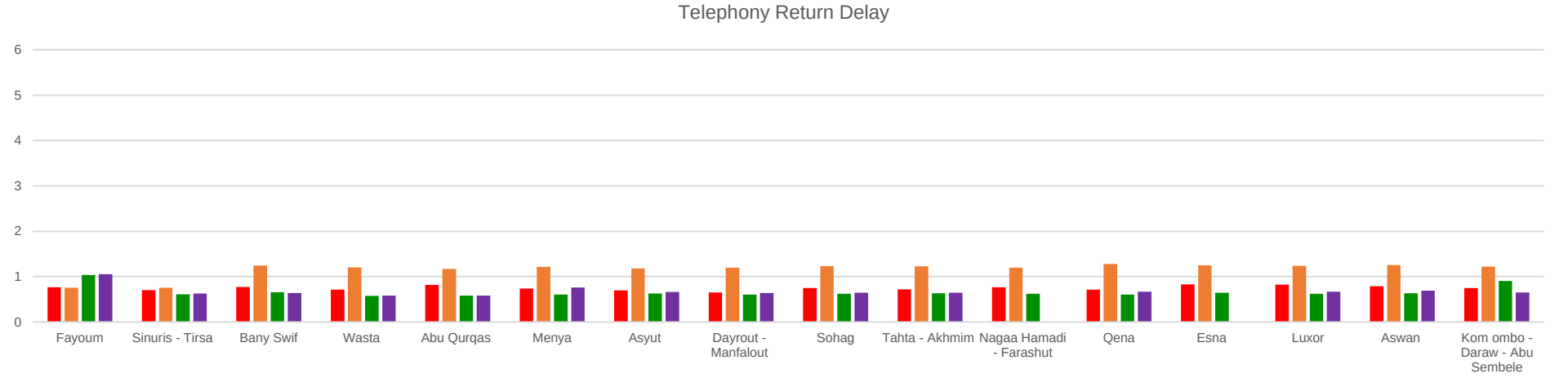
Accessibility: Telephony Return Delay [sec.]





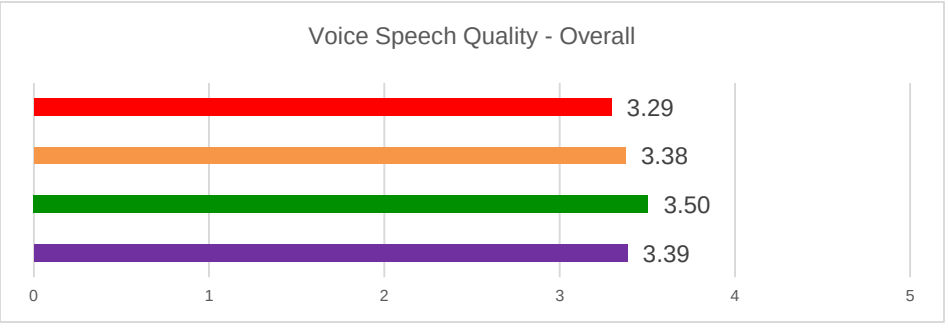


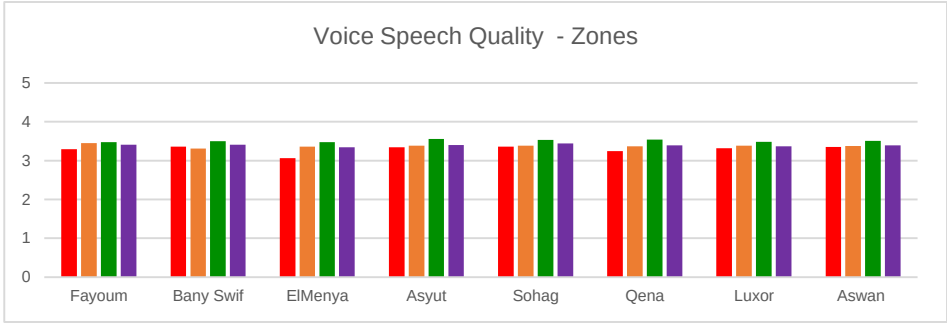
Telephony Return Delay *measures the time that a UE uses to re-join the LTE (4G) network after call end*

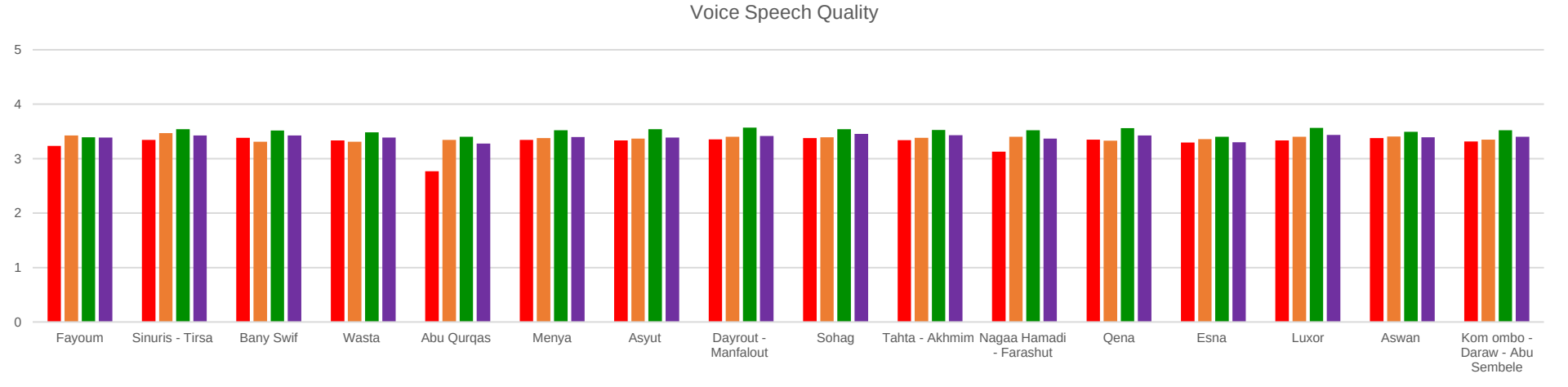


Voice Speech Quality KPI’s

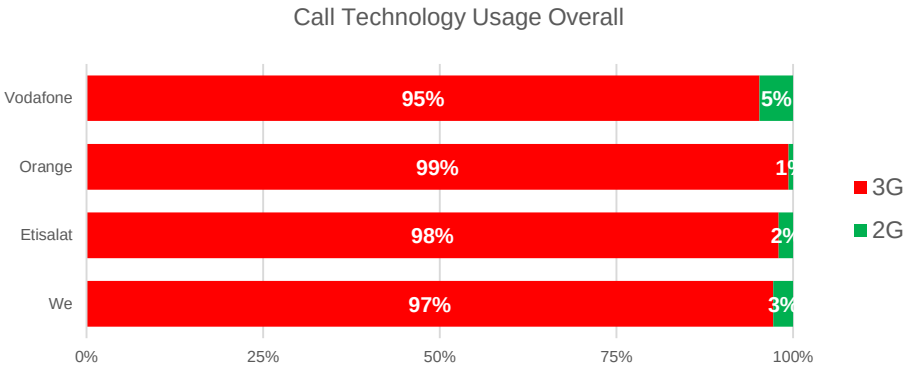
Speech Quality: MOS Scores





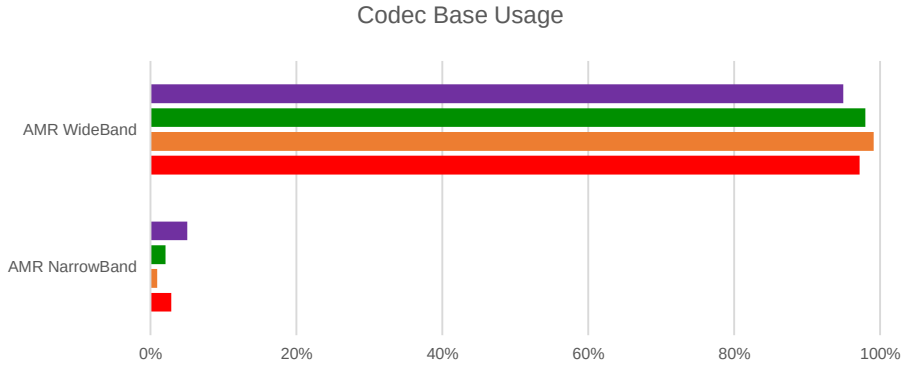


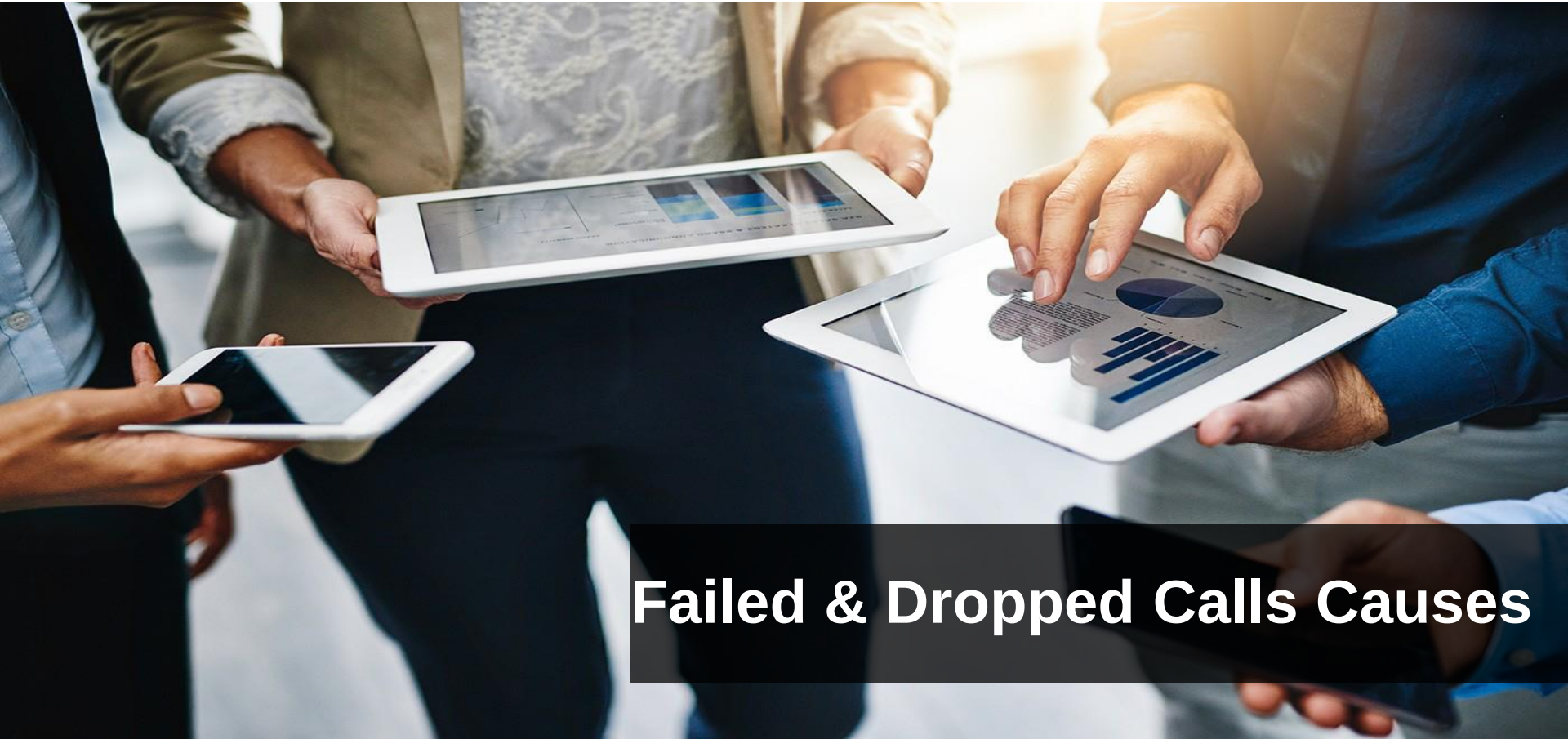
Speech Quality: Call technology Usage & Codec Base Usage



Call technology Usage *represents the call technology used over call period. The more calls on 3G (UMTS) the better MOS served.*

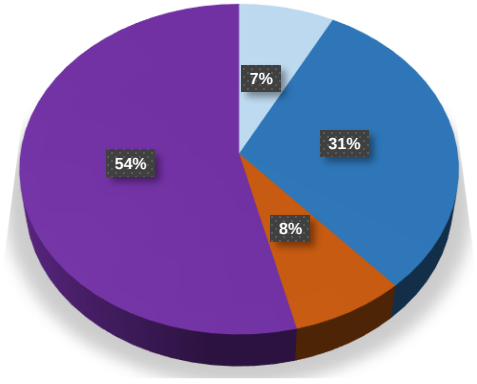
Codec Base Usage *represents the codec used over the call where AMR wideband (AMR WB) leads to better voice quality experience by the end user than the AMR Narrowband (AMR NB)*




Failed & Dropped Calls Causes

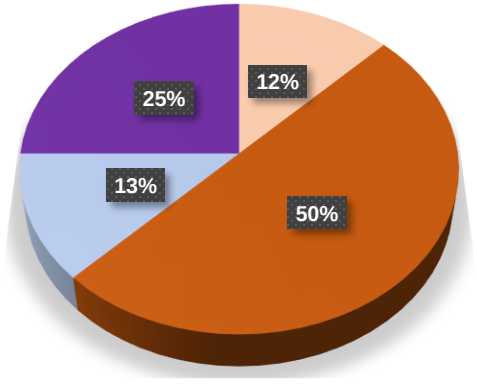
Analysis: Dropped Calls Causes

vodafone



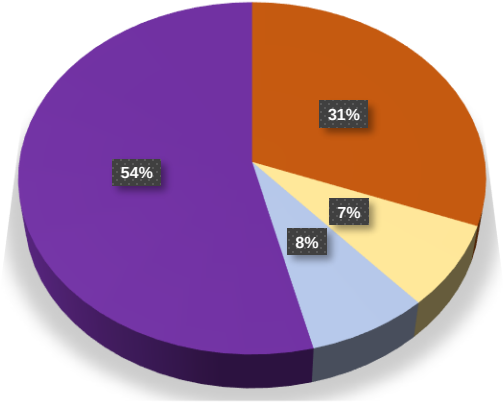
2G Coverage
2G Quality
3G Quality
RAN Issue

orange



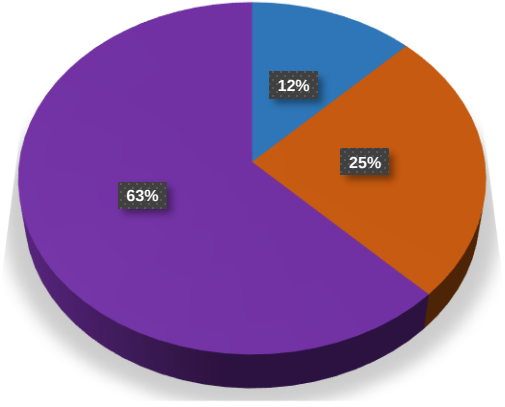
3G Coverage
3G Quality
Mobility Issue
RAN Issue

etisalat



3G Quality
core network
Mobility Issue
RAN Issue

we

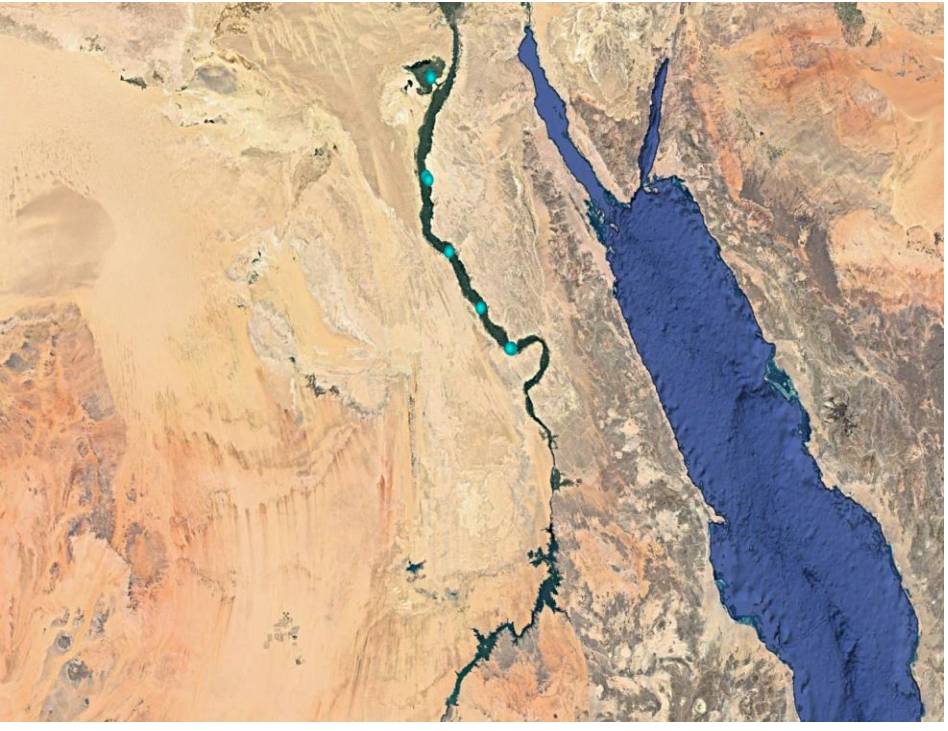


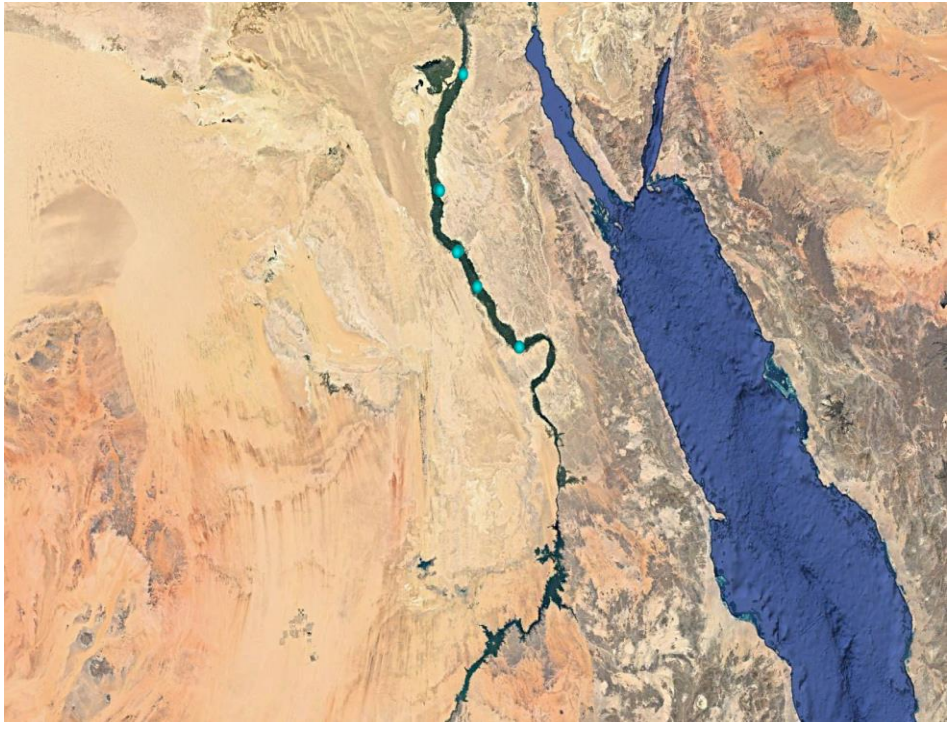
2G Quality
3G Quality
RAN Issue

All Operators: Dropped Calls Locations 1/2

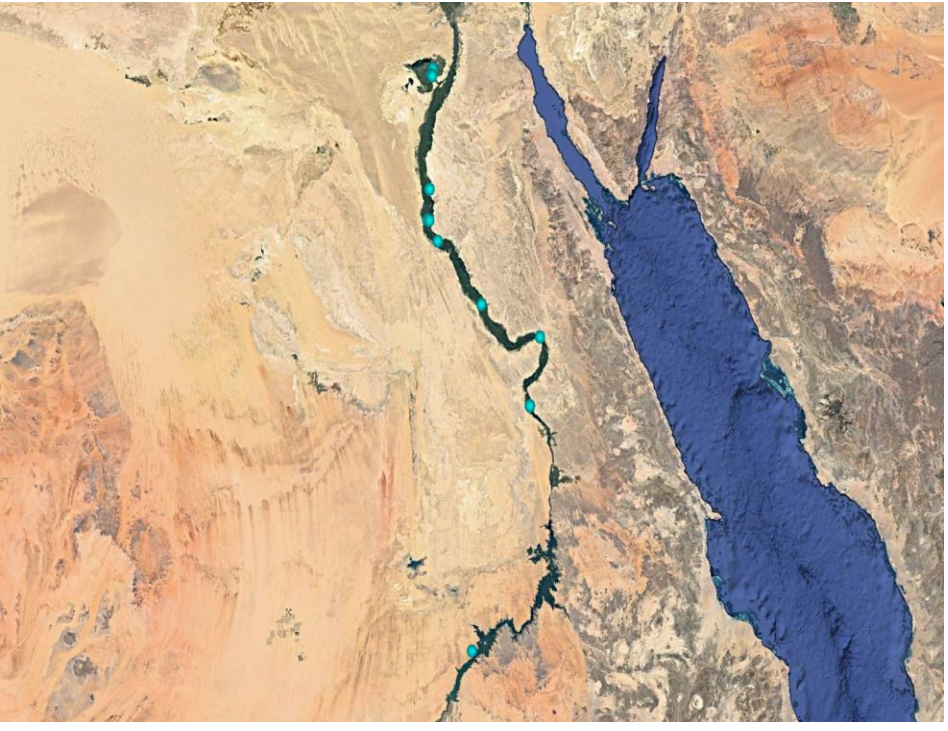
vodafone

orange



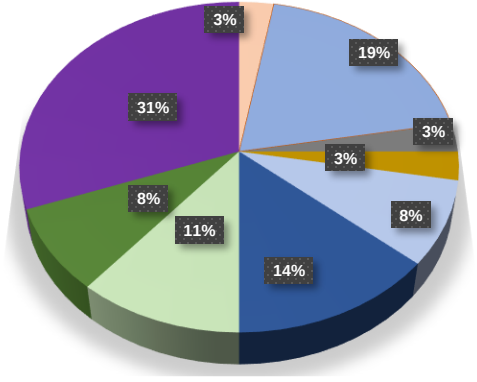


All Operators: Dropped Calls Locations 2/2



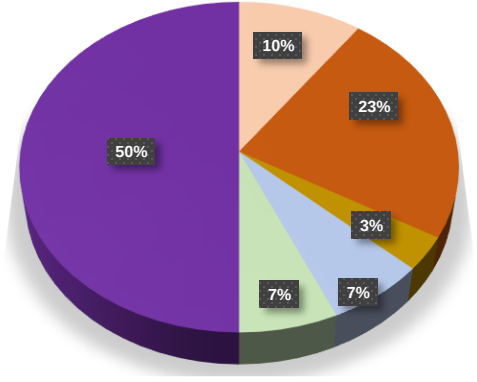
Analysis: Failed Calls Causes

vodafone



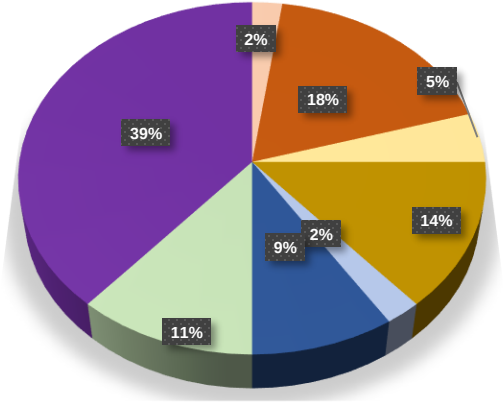
- 3G Coverage
- 3G Quality
- 4G Quality
- CSFB Issue
- Mobility Issue
- No Service
- Other
- paging Issue
- RAN Issue

orange



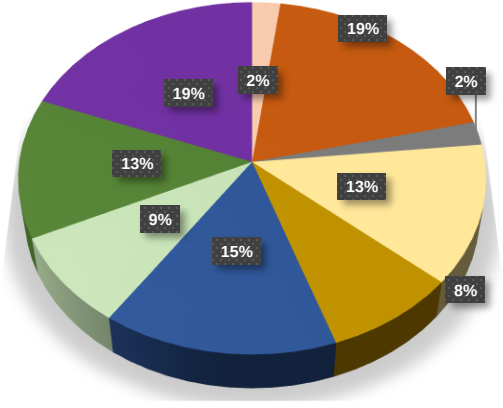
- 3G Coverage
- 3G Quality
- CSFB Issue
- Mobility Issue
- Other
- RAN Issue

etisalat



- 3G Coverage
- 3G Quality
- core network
- CSFB Issue
- Mobility Issue
- No Service
- Other
- RAN Issue

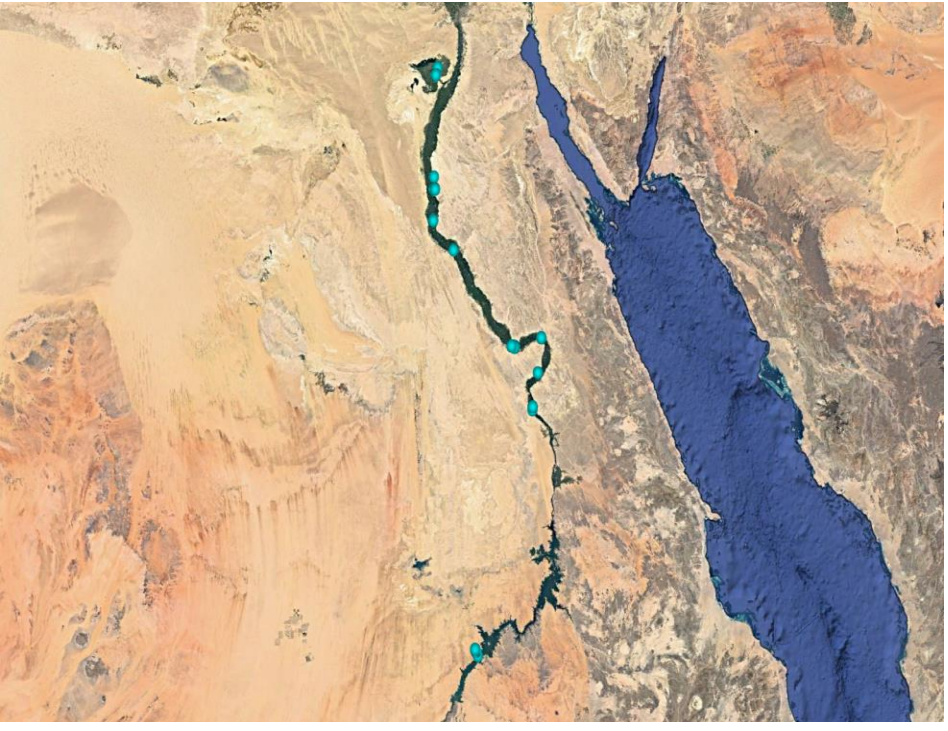
we



- 3G Coverage
- 3G Quality
- 4G Quality
- core network
- CSFB Issue
- No Service
- Other
- paging Issue
- RAN Issue

All Operators: Blocked Calls Locations 1/2

vodafone



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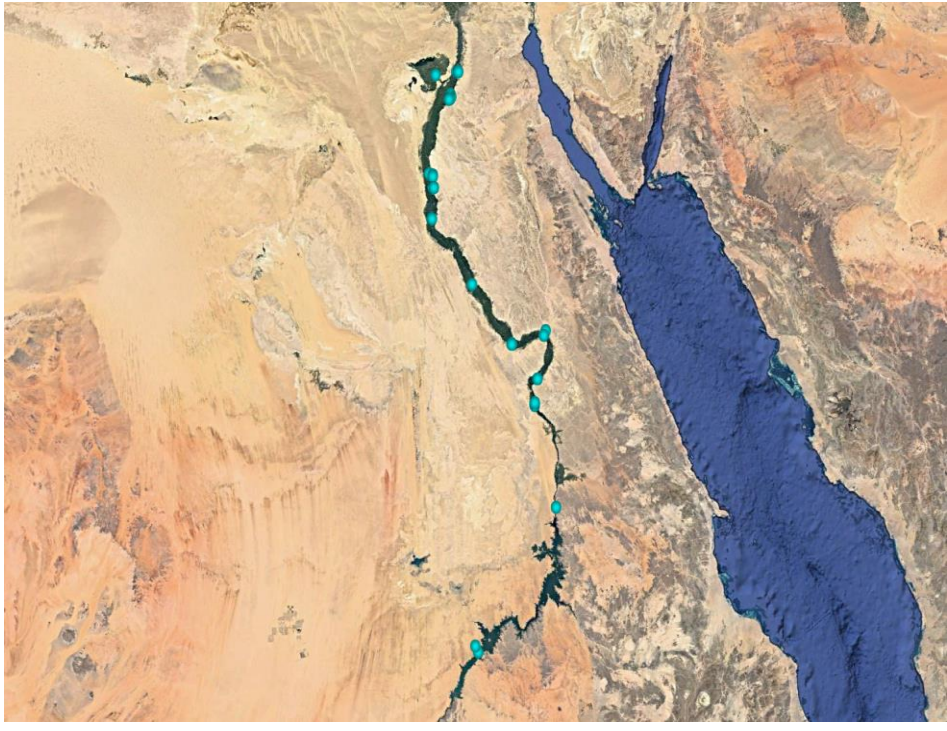
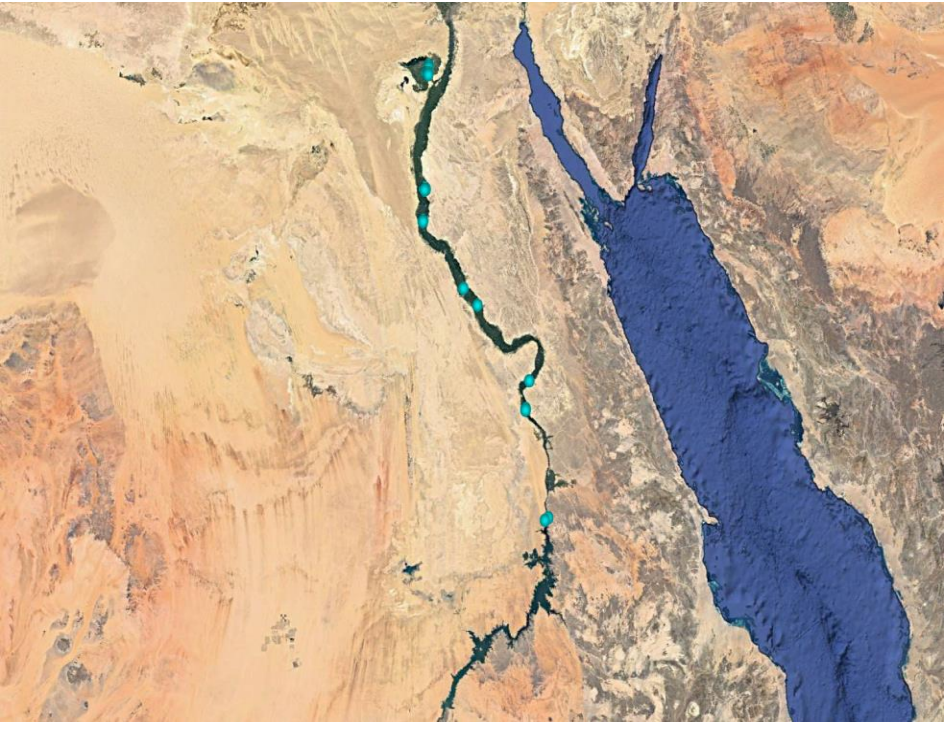


All Operators: Blocked Calls Locations 2/2



Agenda

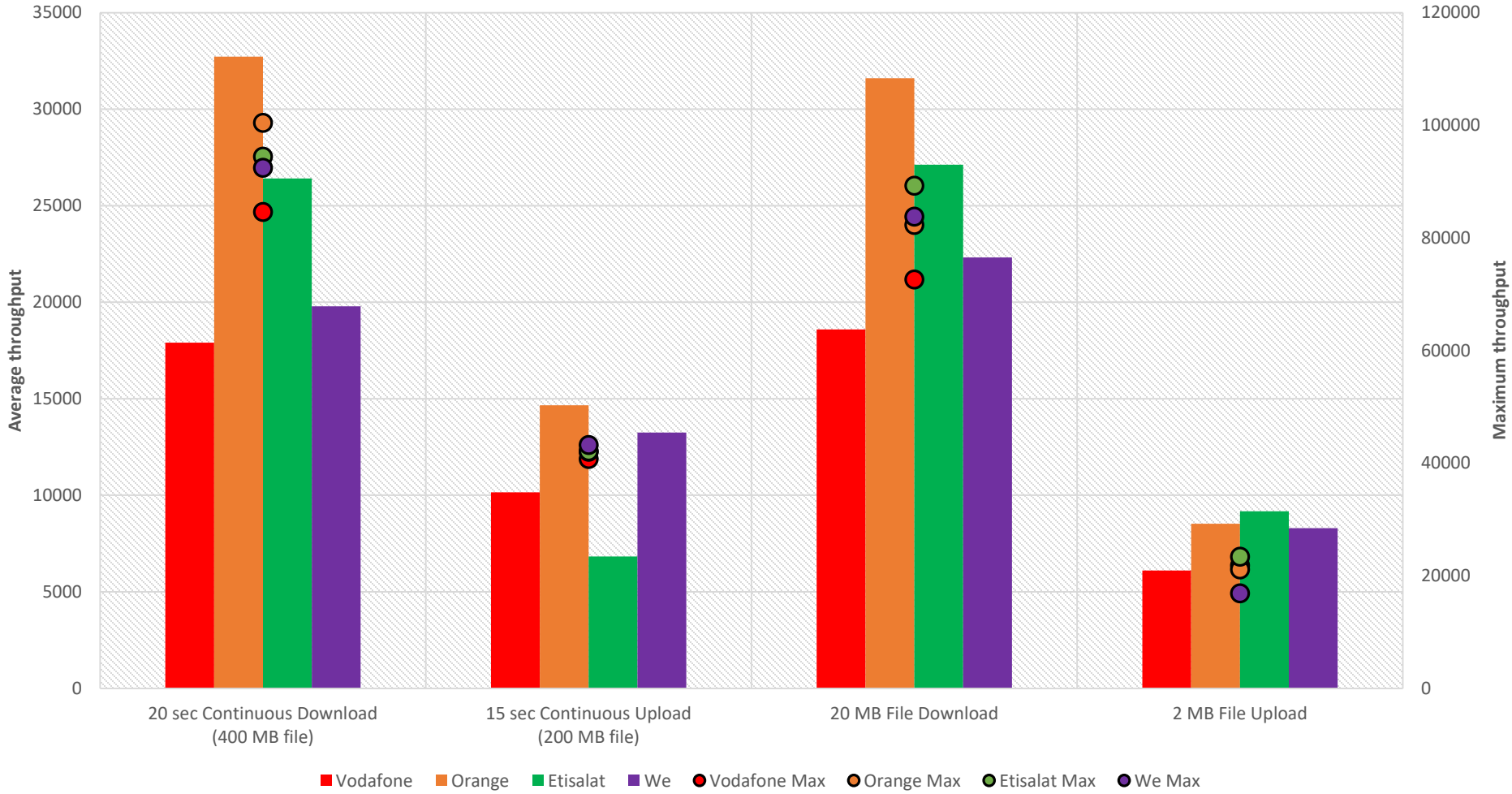
1. *Quantitative Information*
2. *Voice Service Quality & Performance - Cairo*
3. *Data Service Quality & Performance – Cairo*
4. *Voice Service Quality & Performance - Giza*
5. *Data Service Quality & Performance – Giza*
6. *Voice Service Quality & Performance - Alexandria*
7. *Data Service Quality & Performance - Alexandria*
8. *Voice Service Quality & Performance - Delta*
9. *Data Service Quality & Performance – Delta*
10. *Voice Service Quality & Performance – Upper Egypt*
11. ***Data Service Quality & Performance – Upper Egypt***
12. *Annexes*

Data Service KPI’s

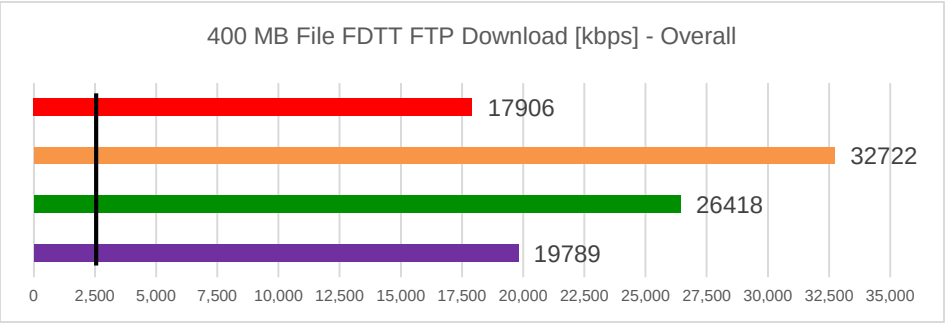
Free Mode Throughput Per Test Type

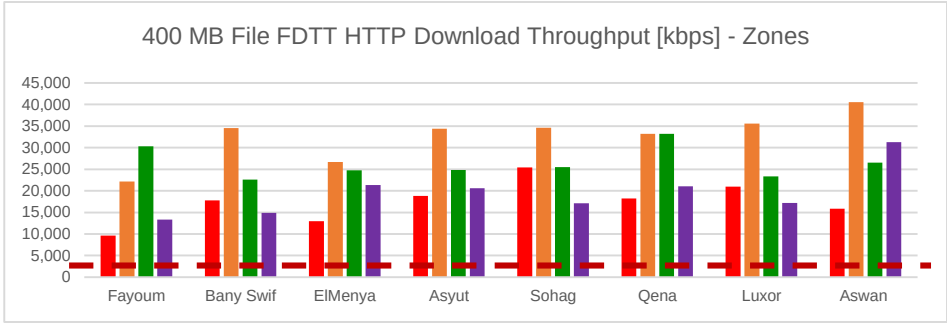
NETWORK PERFORMANCE TEST

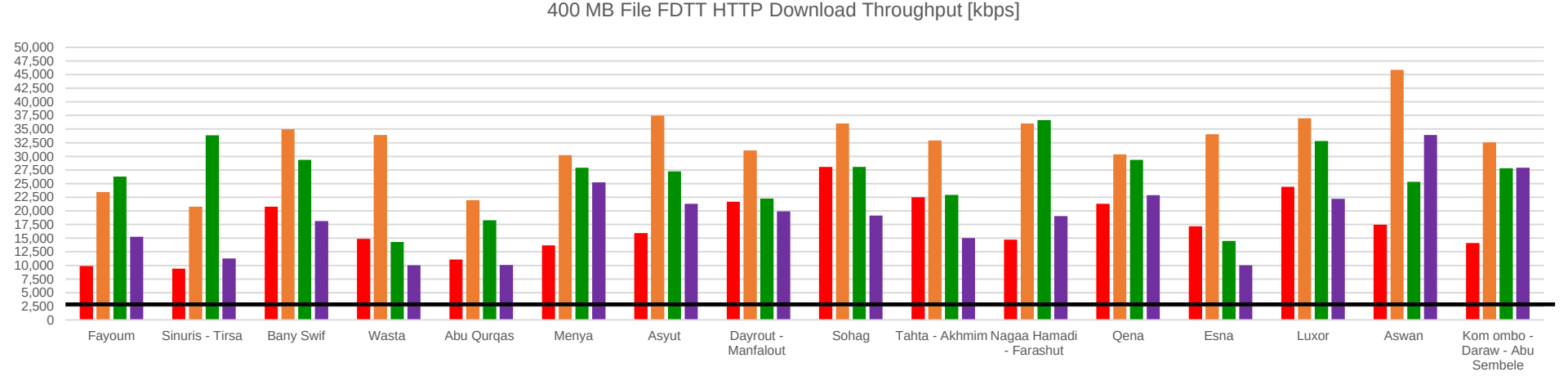
USER EXPERIENCE TEST



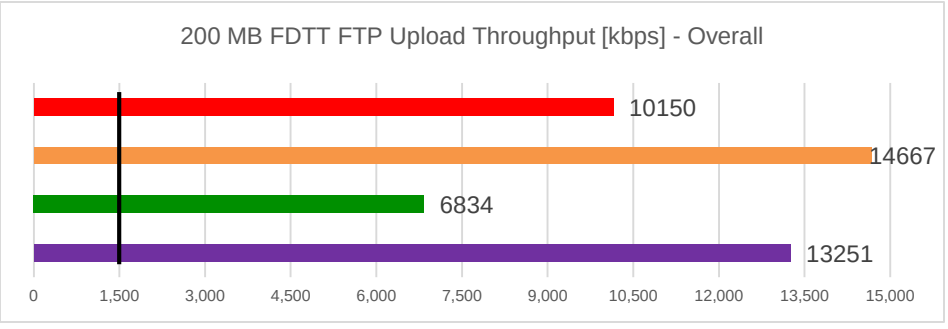
FDTT HTTP Download Transfer Throughput – Network Performance

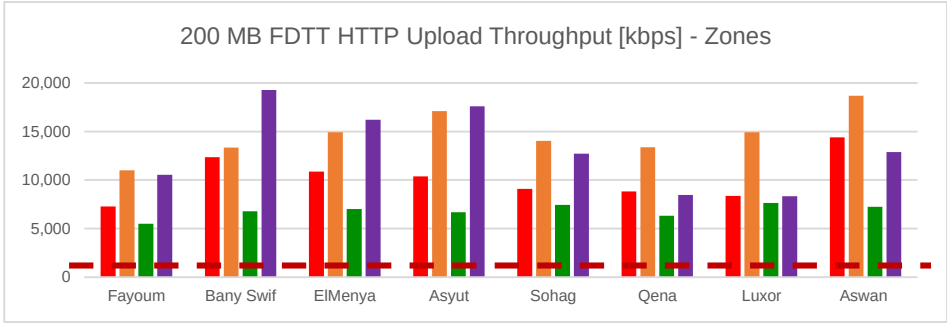


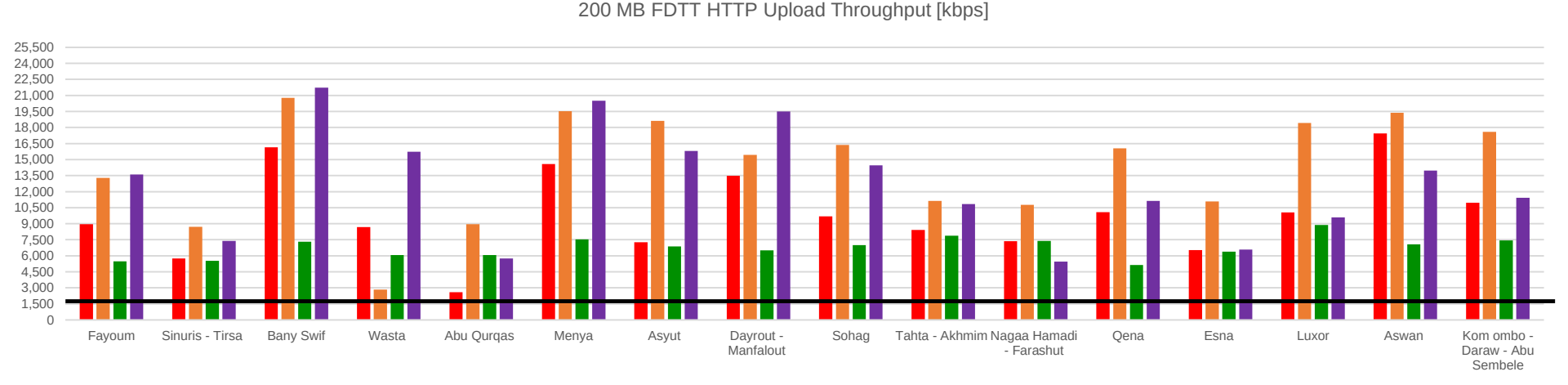




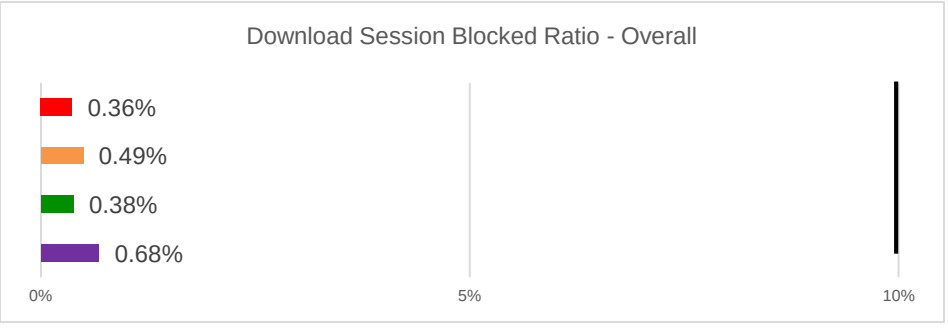
FDTT HTTP Upload Transfer Throughput – Network Performance

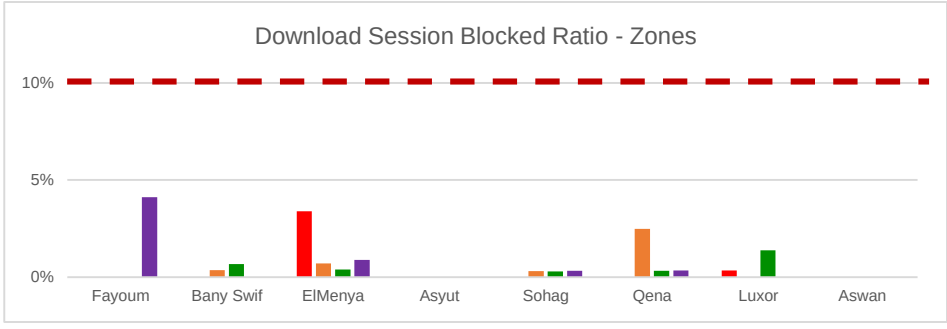


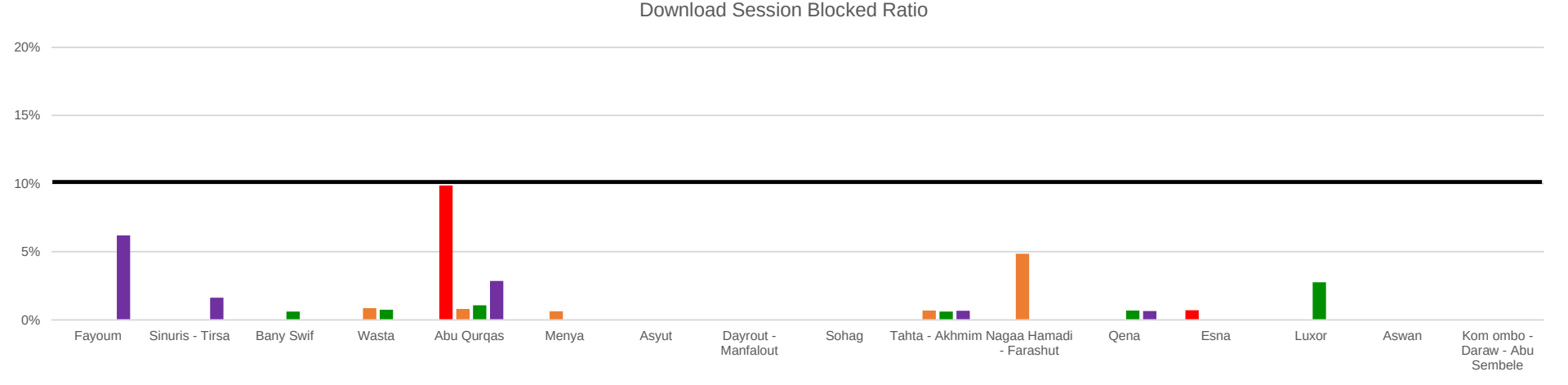




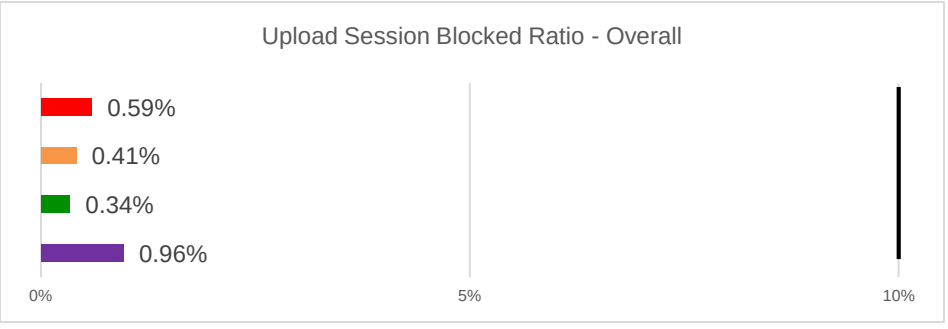
HTTP Download Session Blocked Rates

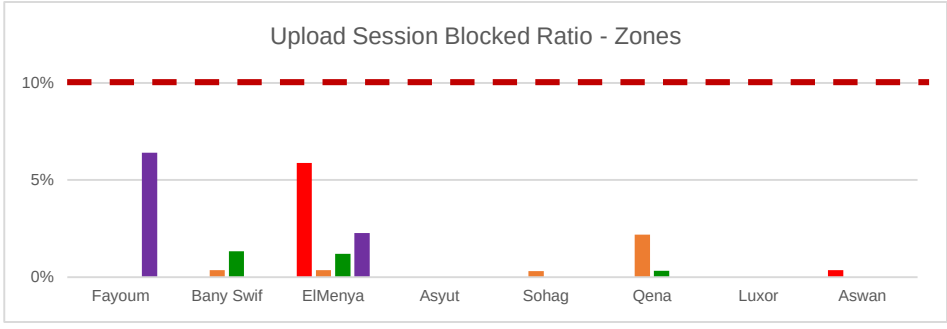


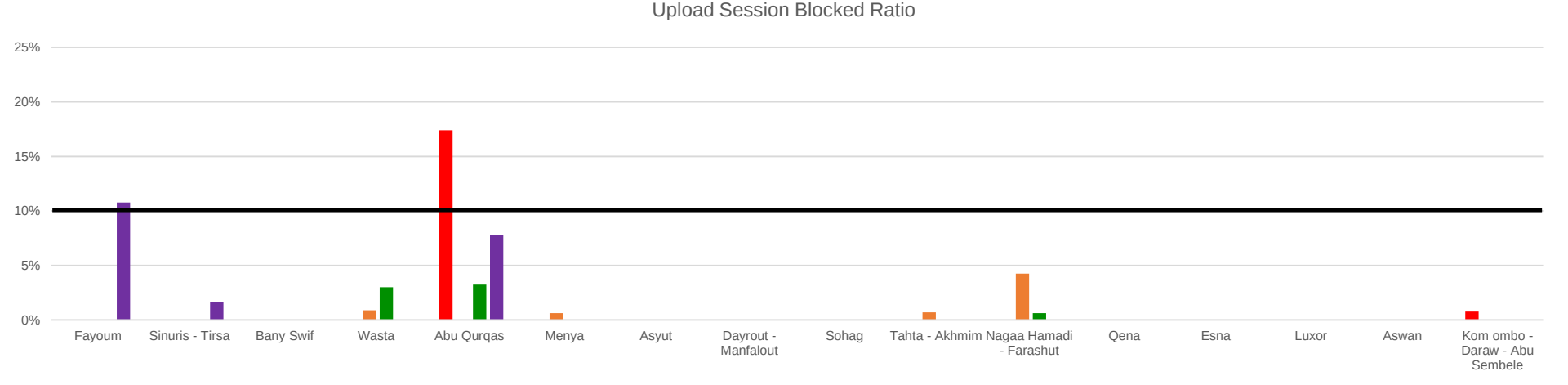




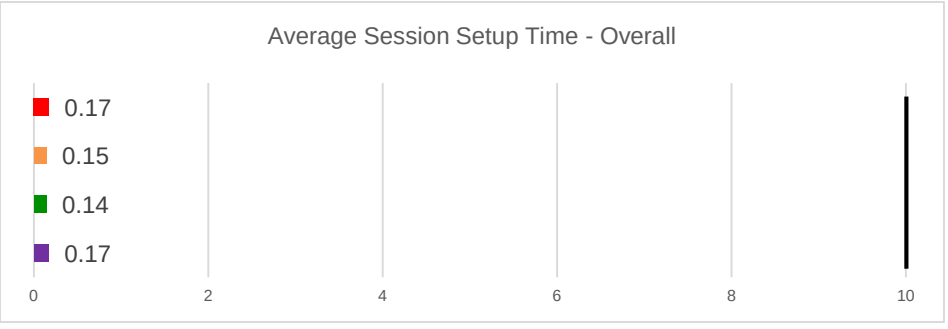
HTTP Upload Session Blocked Rates

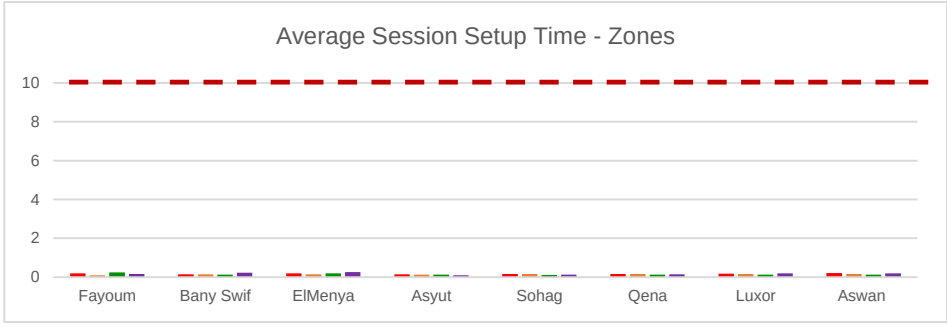


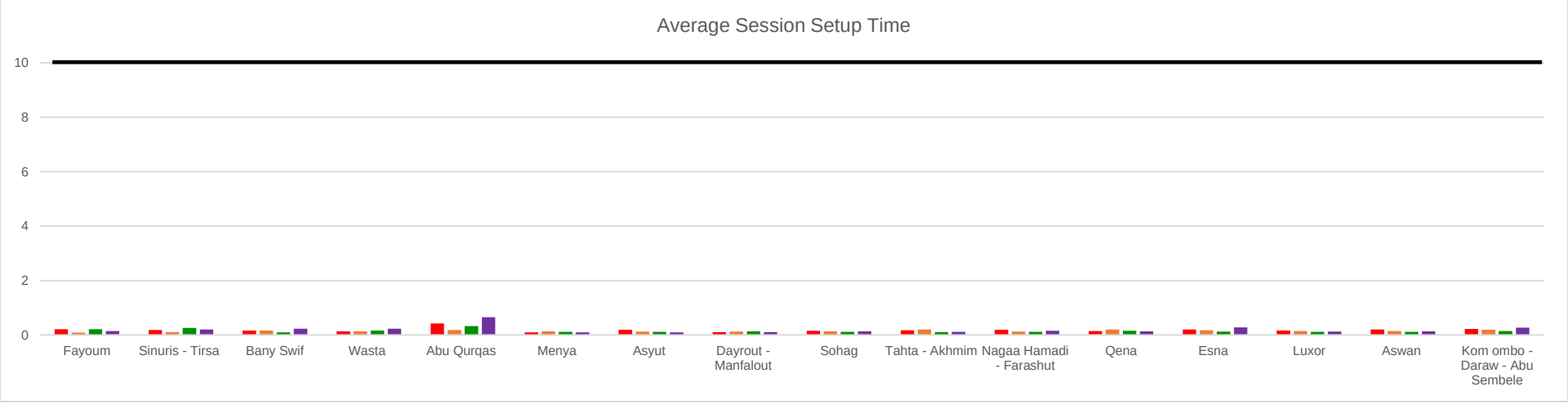




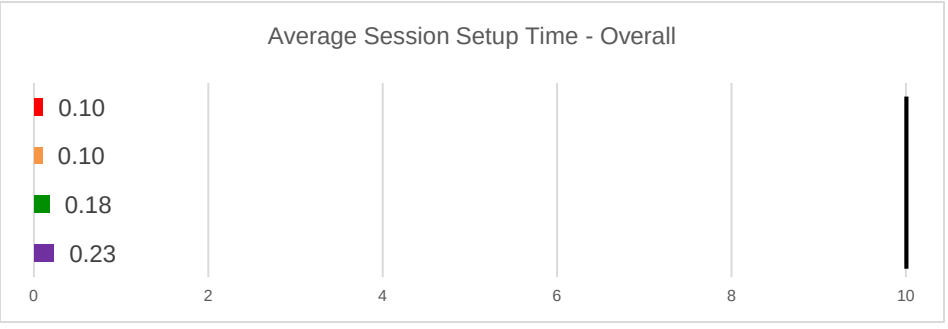
HTTP Download Average Session Setup Time

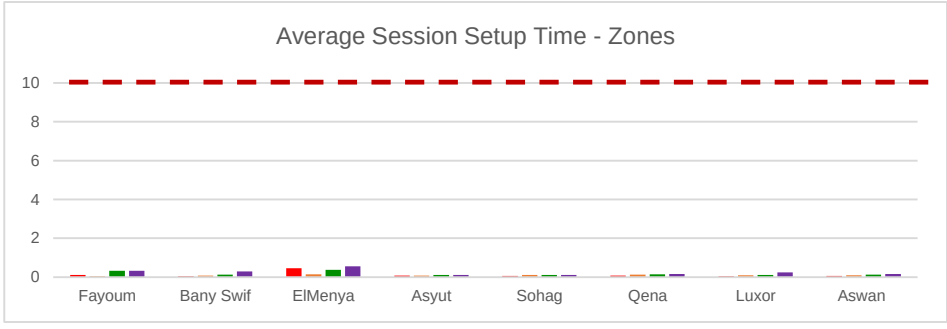


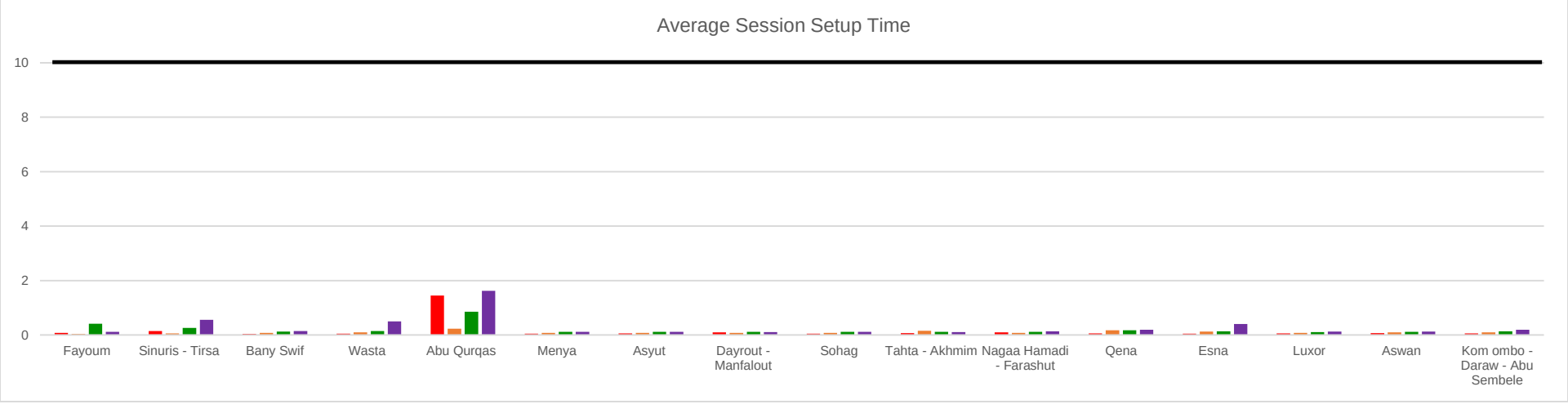




HTTP Upload Average Session Setup Time

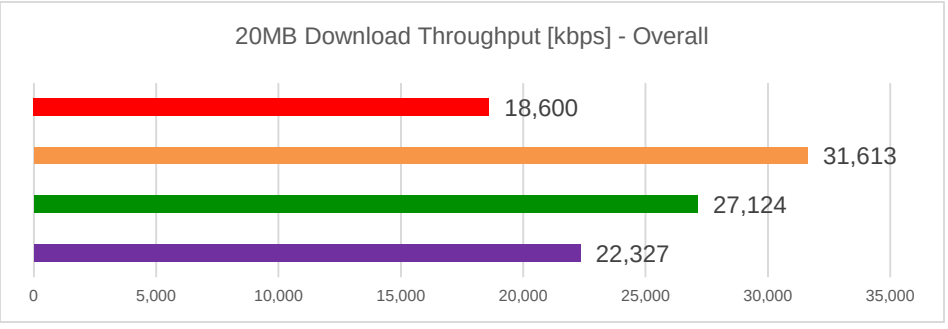


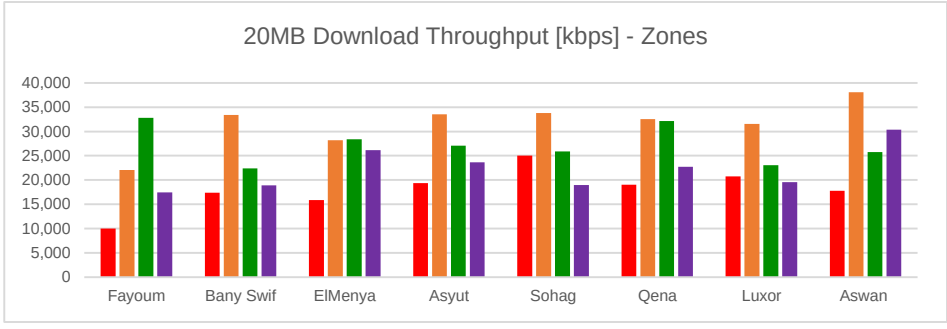


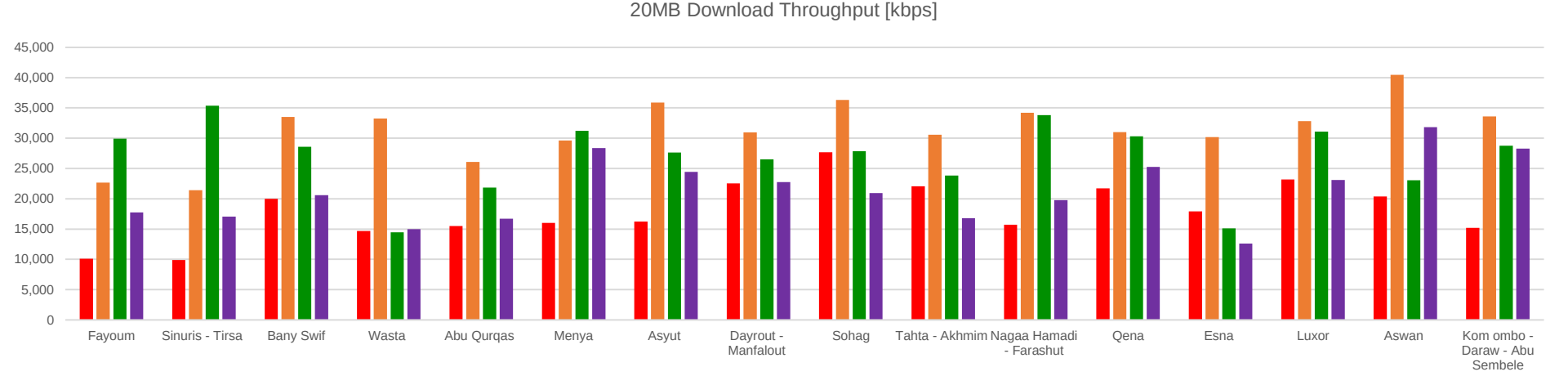


Throughput KPI’s – Customer Experience

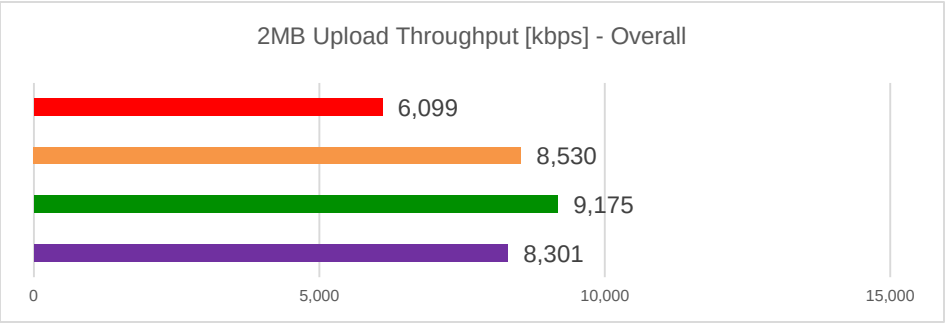
HTTP Download Throughput – Customer Experience

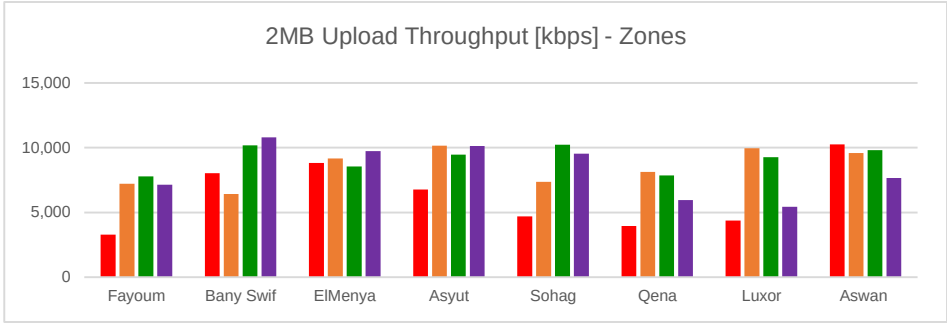


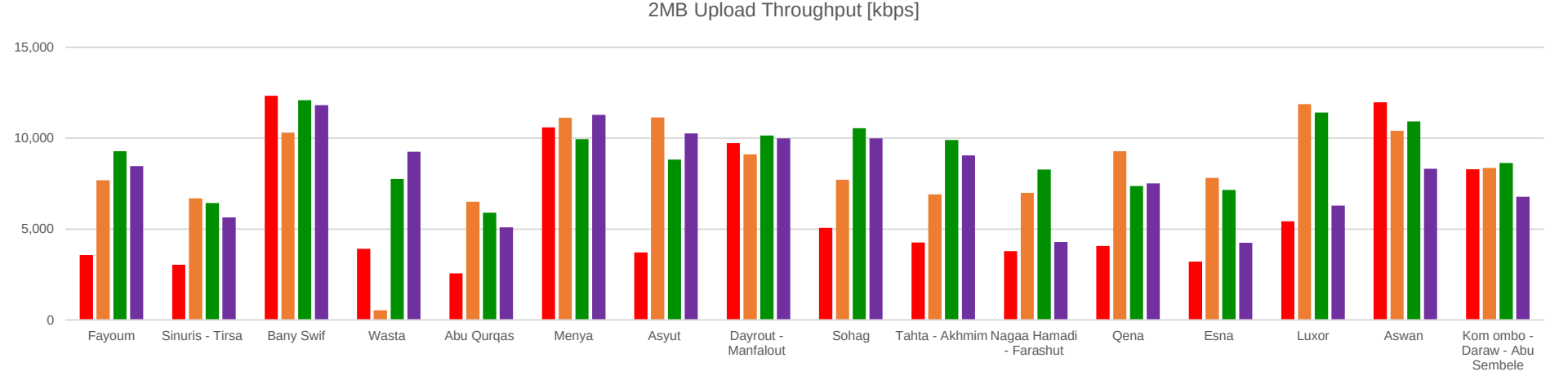


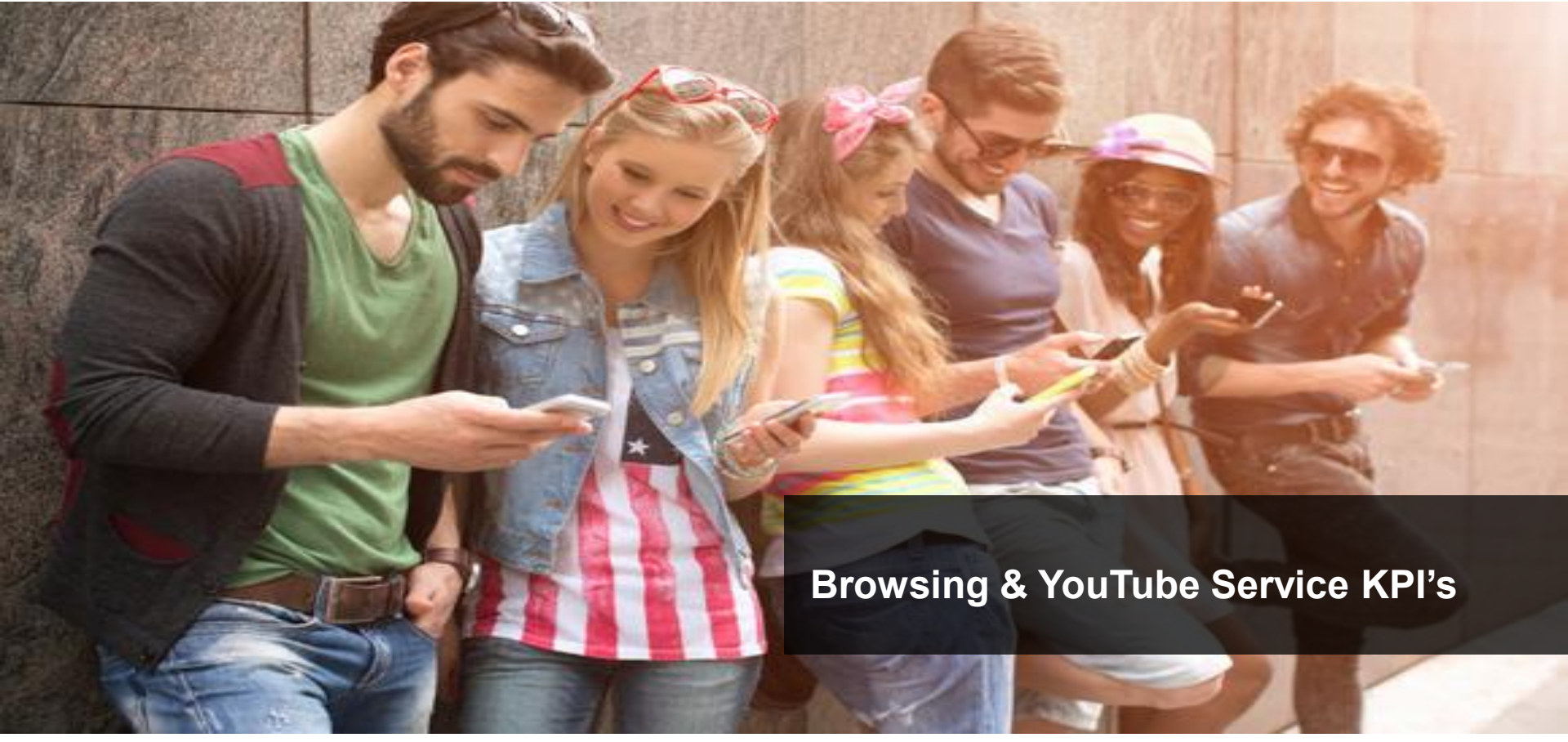


HTTP Upload Throughput – Customer Experience



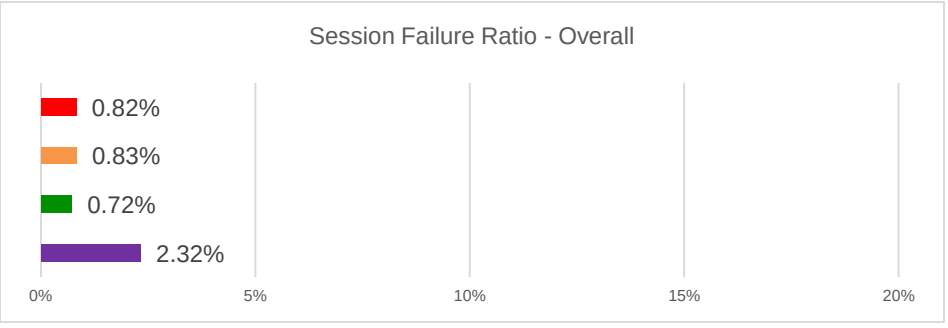


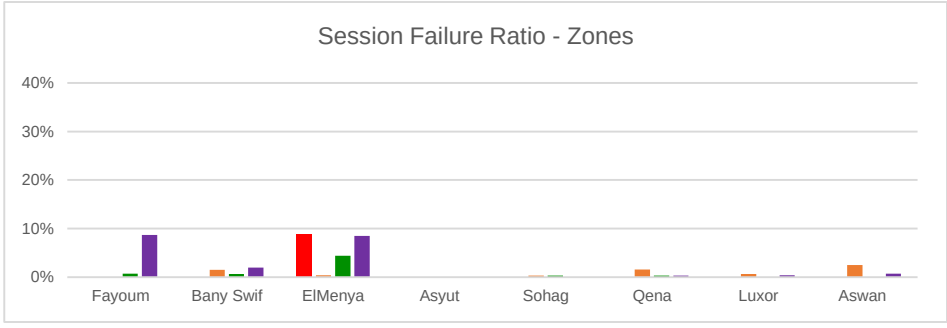


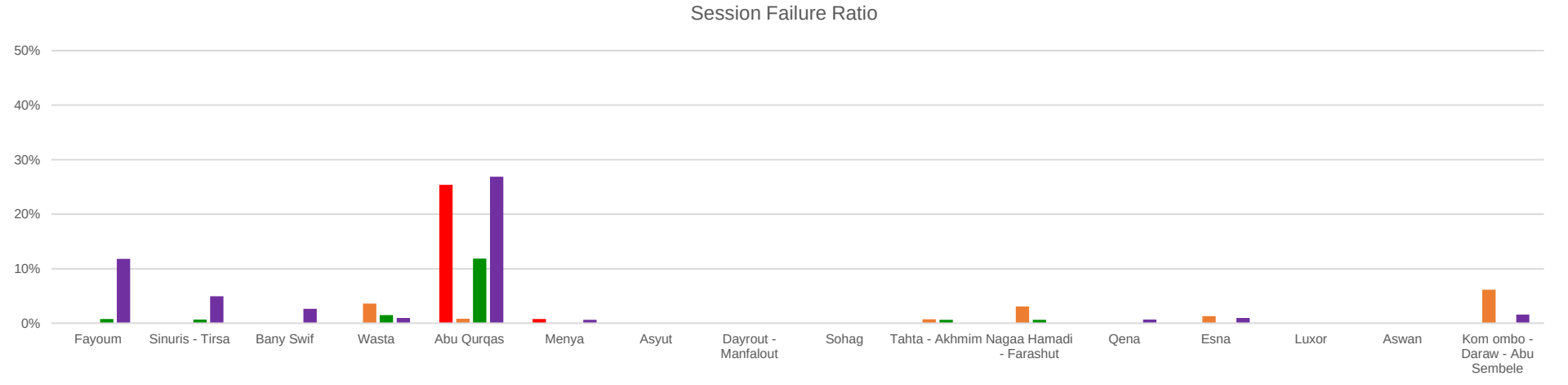


Browsing & YouTube Service KPI’s

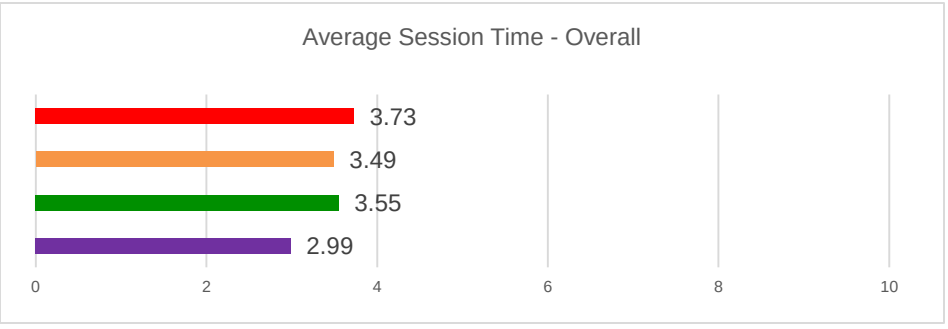
Session Failure Ratio

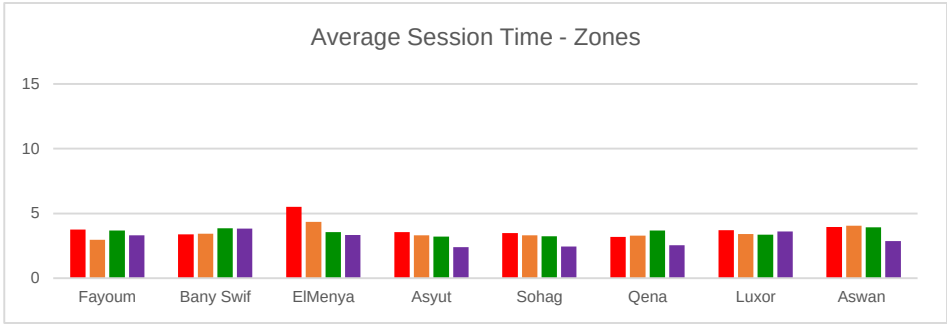


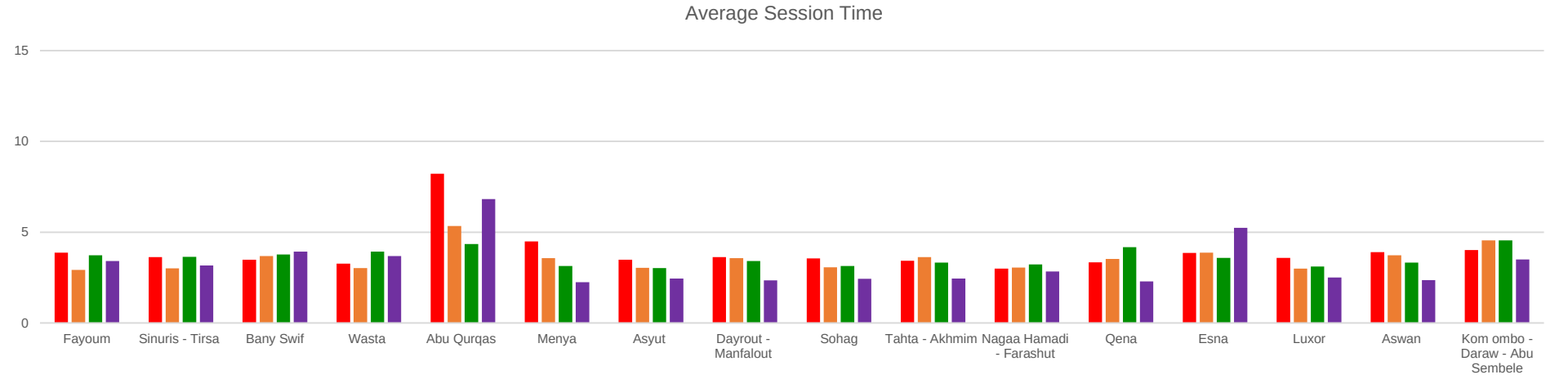




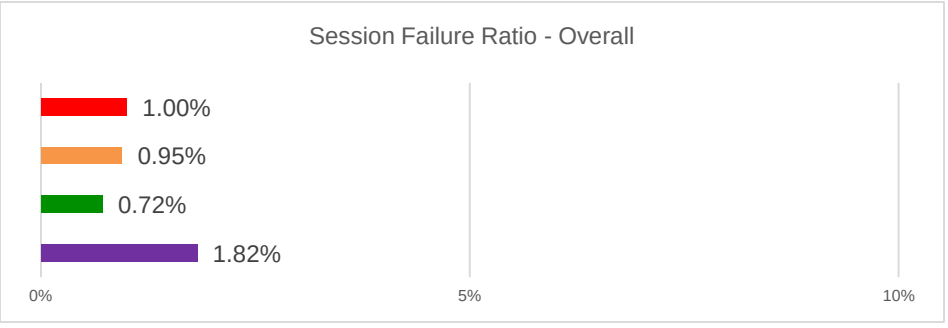
Session Time

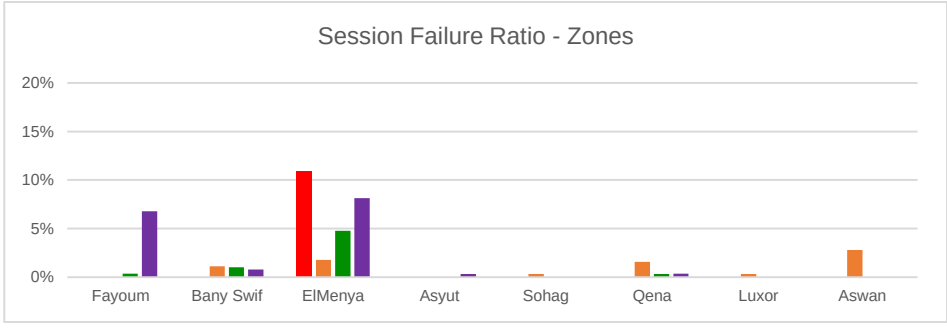


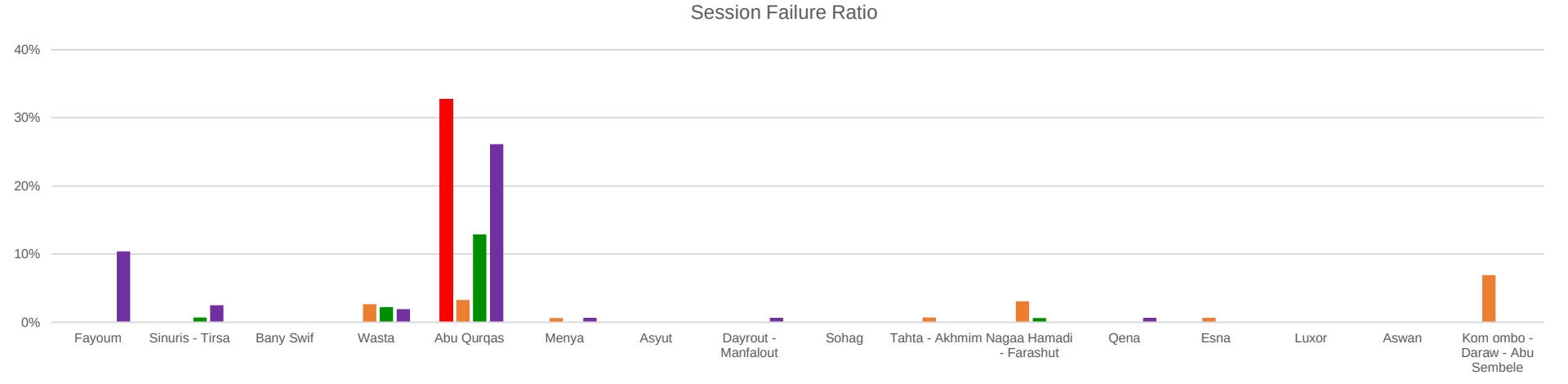




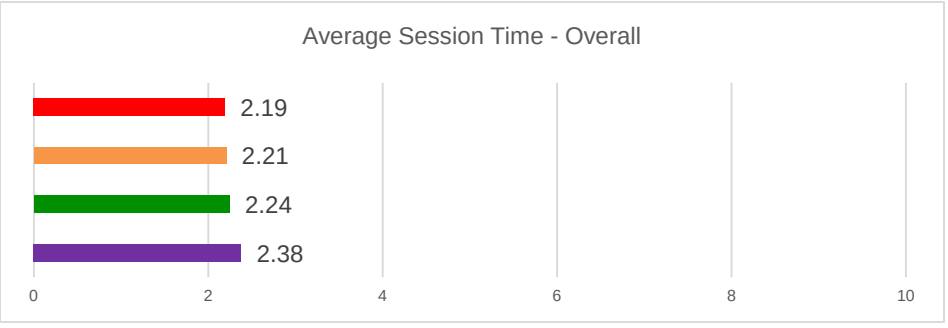
Google Session Failure Ratio

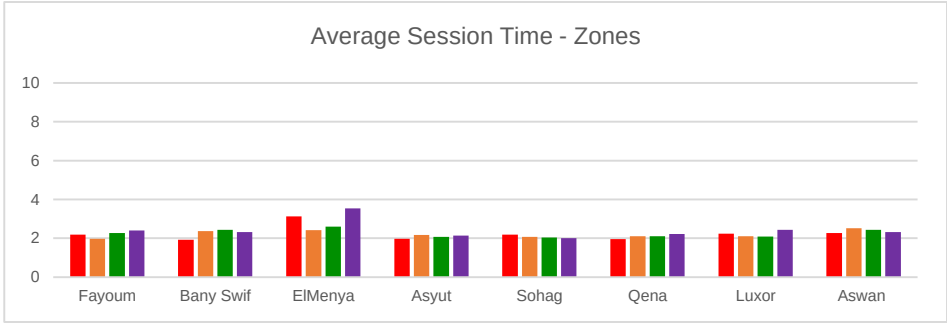


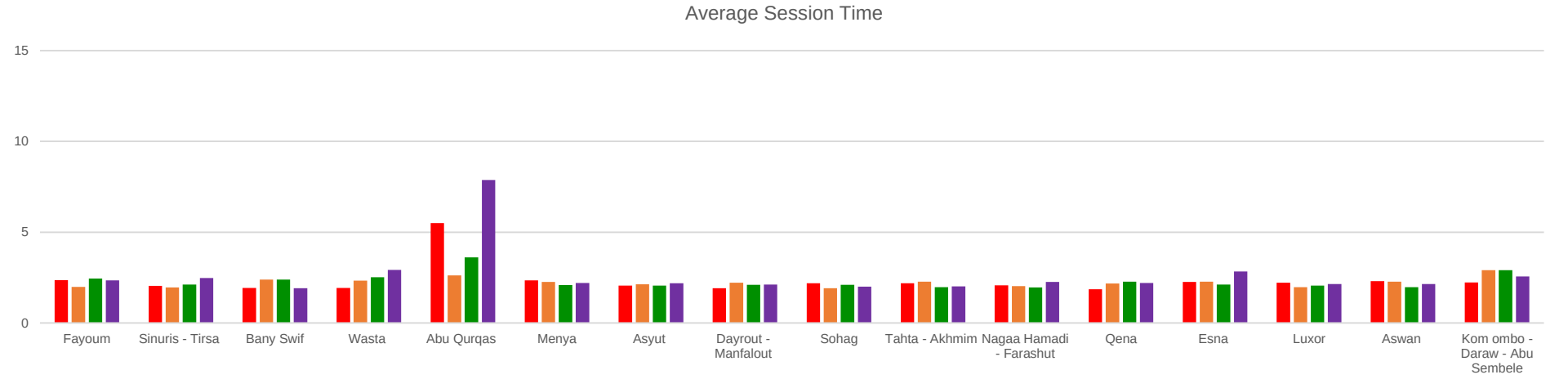




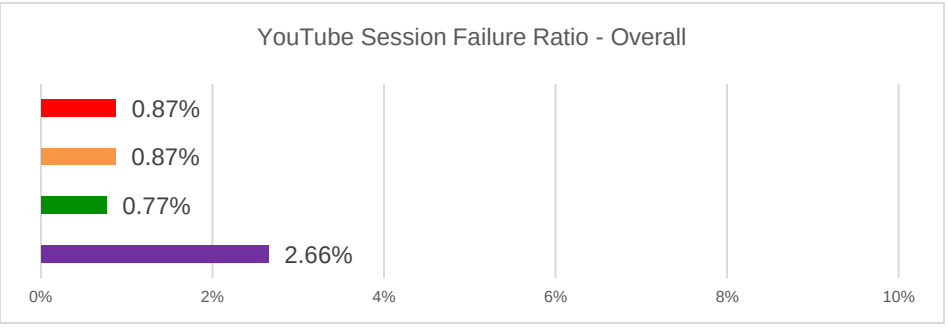
Google Session Time

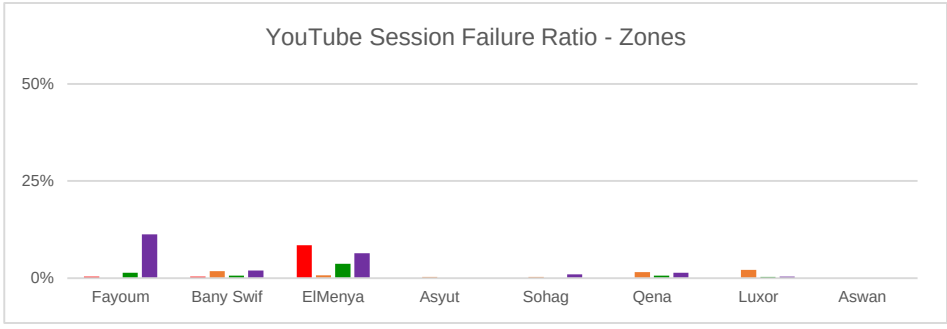


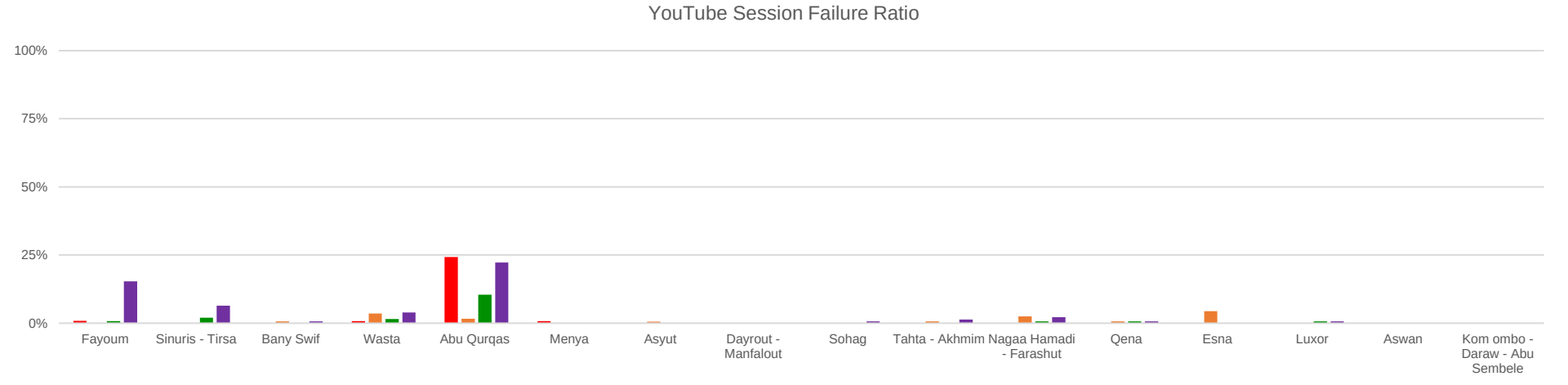




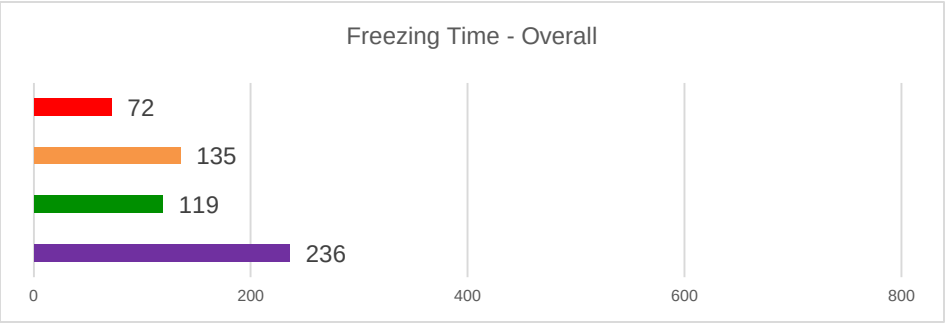
YouTube Session Failure Ratio

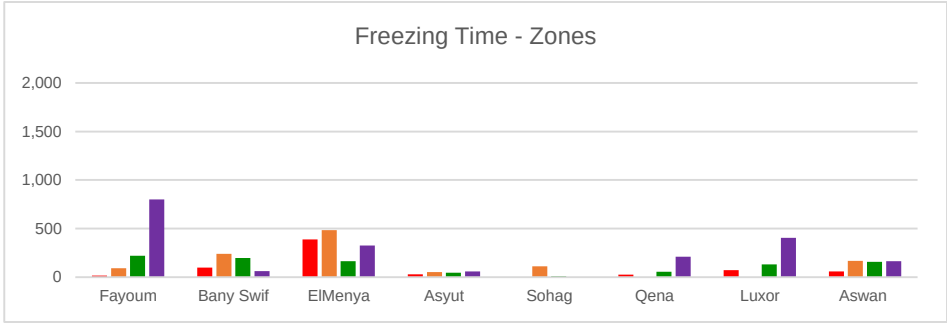


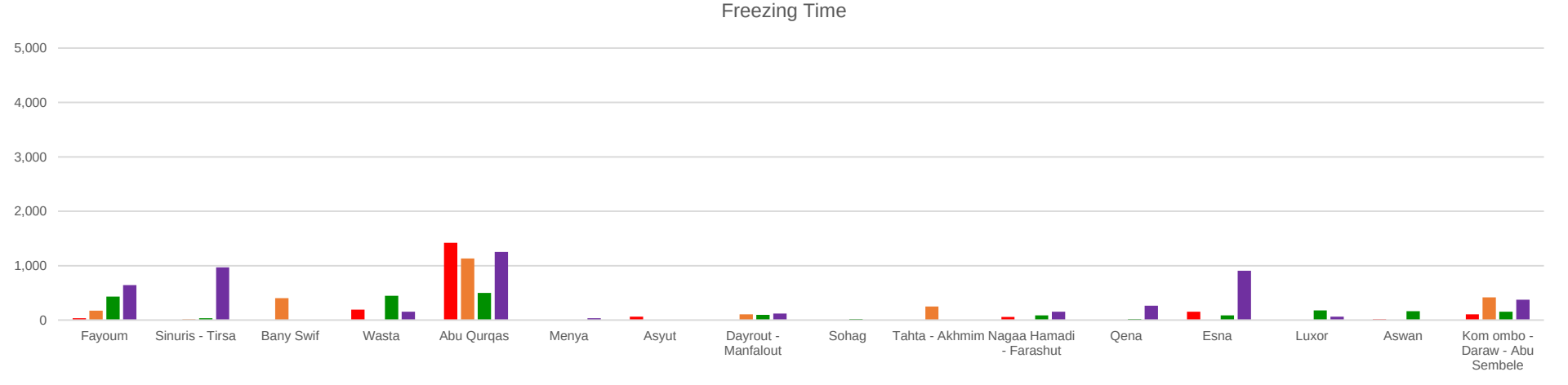




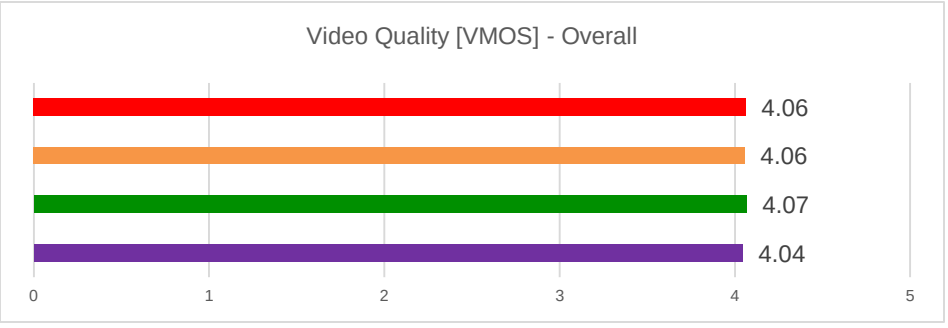
YouTube Freezing Time [msec]

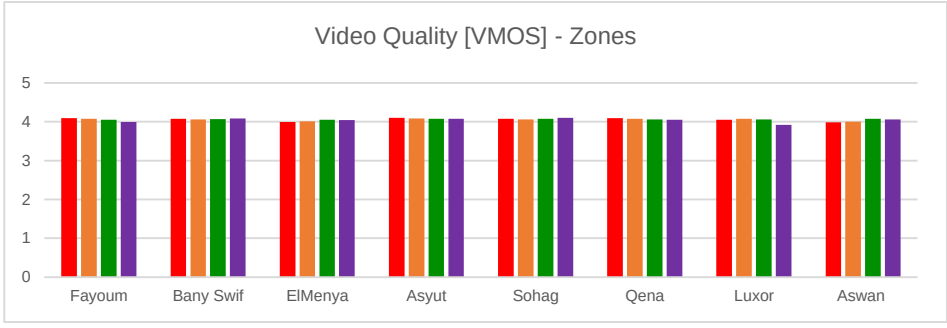


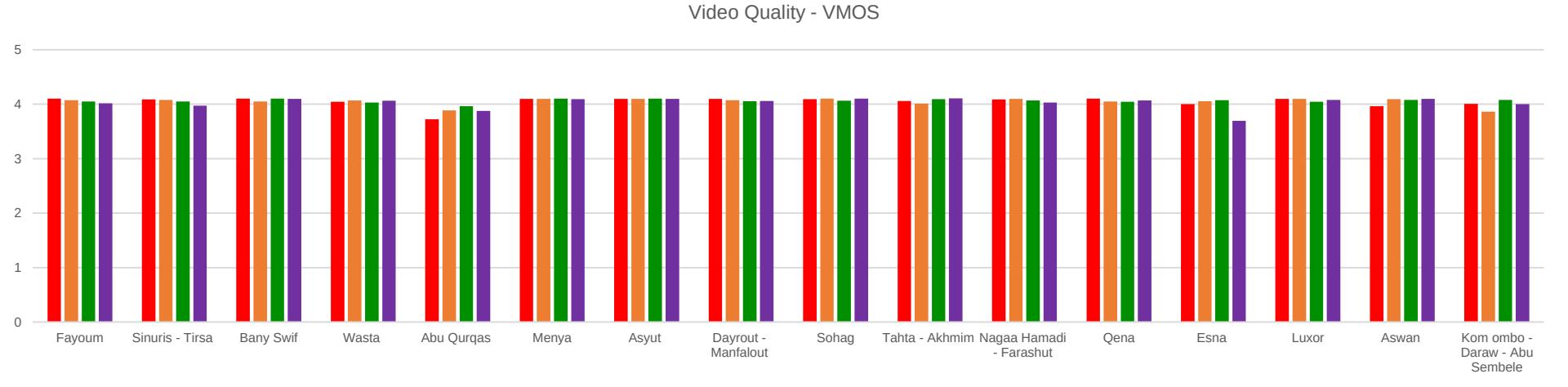




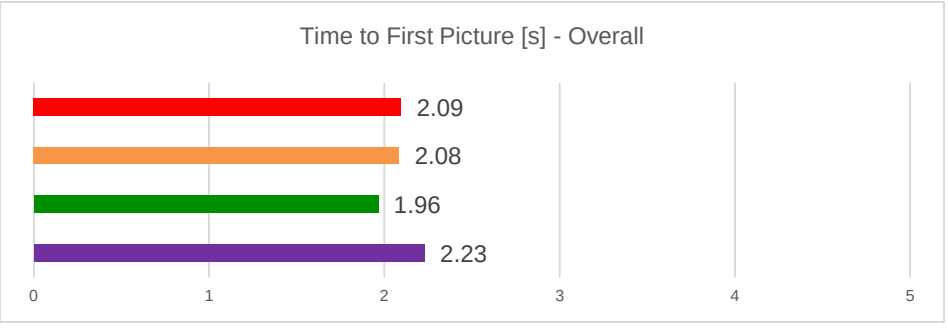
YouTube Video Quality

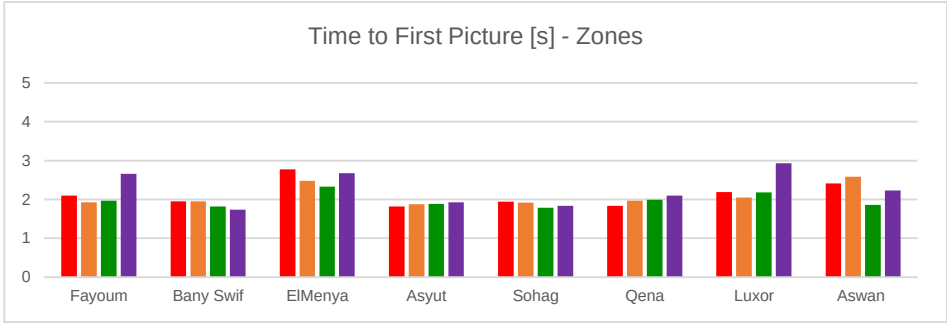


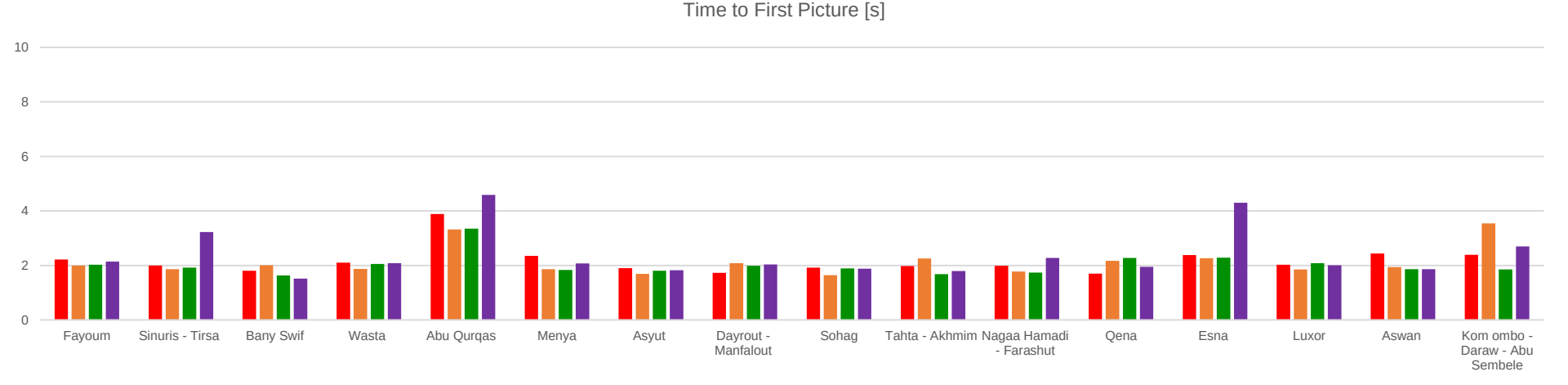




YouTube Time to 1st Picture

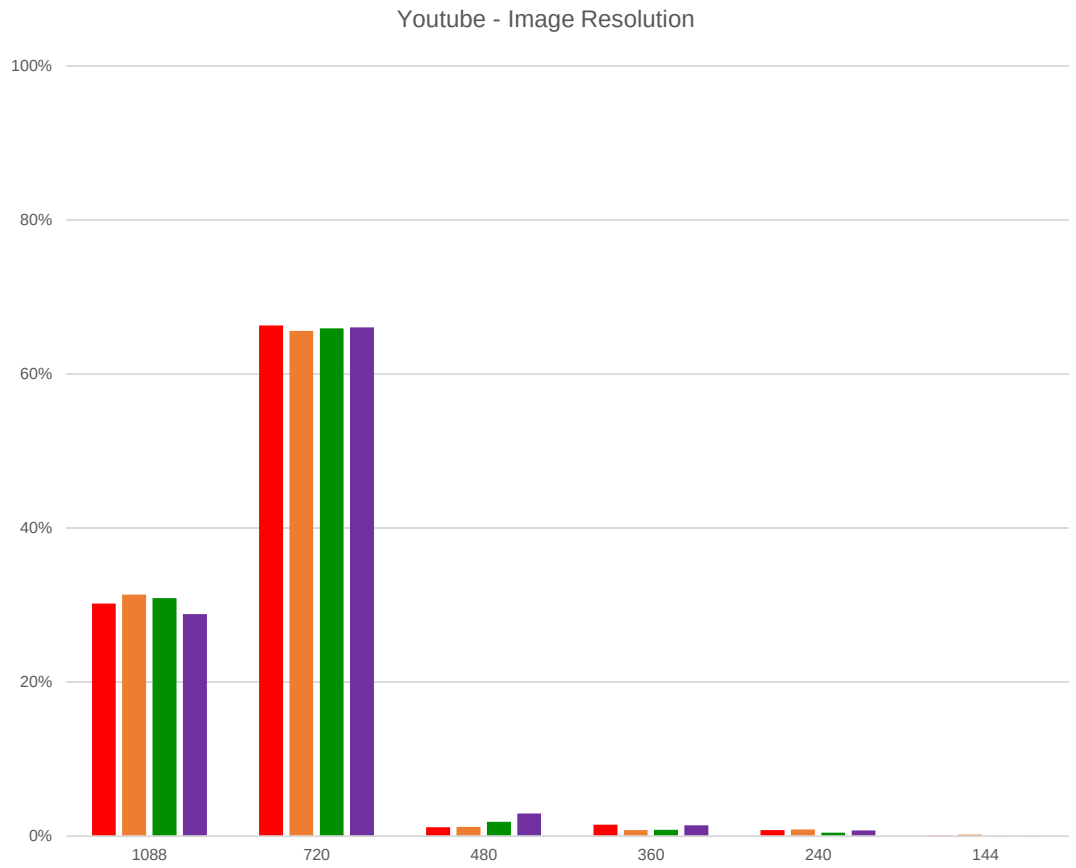






YouTube

Image Resolution



Agenda

1. *Quantitative Information*
2. *Voice Service Quality & Performance - Cairo*
3. *Data Service Quality & Performance – Cairo*
4. *Voice Service Quality & Performance - Giza*
5. *Data Service Quality & Performance – Giza*
6. *Voice Service Quality & Performance - Alexandria*
7. *Data Service Quality & Performance - Alexandria*
8. *Voice Service Quality & Performance - Delta*
9. *Data Service Quality & Performance – Delta*
10. *Voice Service Quality & Performance – Upper Egypt*
11. *Data Service Quality & Performance – Upper Egypt*
12. ***Annexes***

KPI definitions

Voice KPIs

Call Blocked Rate: (licensed KPI)
The percentage of unsuccessful call setup attempts to the total number of call attempts in a specified period.
Threshold value = 2 %.

Call Dropped Rate: (licensed KPI)
The percentage of dropped or interrupted calls without the subscriber's permission after successful call establishment to the total number of successfully established attempts.
Threshold value = 2 %

Bad Speech Voice Quality Rate: (licensed KPI)
The percentage of bad speech voice calls (less than 2.8) scored on MOS score which is a measure for end-to-end (mouth to ear) speech quality of a voice service call to the total number of completed calls.
Threshold value = 10 %

CSFB Call Setup Failure Rate (licensed KPI)
The ratio between unsuccessful CSFB Call setup attempts to all successful CSFB Call setup attempts for the calling UE.
Threshold value = 4 %

Call Access: (non-Licensed KPI)
represents the period of time elapsed from the sending of a complete destination address (target number) to the setting up of a call to the receiving terminal.

CSFB Delay: (non-Licensed KPI)
represents the period of time to overlay 3G/2G environment instead of handling calls in 4G (LTE). Depending on the CSFB strategy.

Telephony Return Delay: (non-Licensed KPI)
measures the time that a UE uses to re-join the LTE (4G) network after call end

KPI definitions

Data KPIs

Session Blocked Rate: (Licensed KPI's)
The Percentage ratio of number of data sessions setup that failed to attach on the network data domain to the total number of sessions.
Average Session Setup Time: (Licensed KPI's)
The time taken in seconds to access network data domain averaged over all sessions.
Average http download throughput: (Licensed KPI's)
The average rate of successful data downloaded over a communication channel. The throughput is measured in bits per second (bit/s or bps).
Average http Upload throughput: (Licensed KPI's)
The average rate of successful uploaded data over a communication channel. The throughput is measured in bits per second (bit/s or bps).

YouTube Session Failure: (Non-Licensed KPI's)
Stream session failure rate in percentage equal Total number of Streams / Total number of failed Streams .
Freezing Time: (Non-Licensed KPI's)
Average freezing during stream in miliseconds. The relative amount of freezing in the stream, that is, the ratio between the total time of freezings and the video sequence duration.
Video Quality: (Non-Licensed KPI's)
Average of visual quality from an average of visual quality per video stream. The predicted MOS value lies in the range of 1 to 5, where 1 stands for bad, and 5 for excellent stream quality.
Time to 1st Picture: (Non-Licensed KPI's)
Average Time to first picture appear in seconds for the sessions
Image Resolution: (Non-Licensed KPI's)
The total percentage of Image resolutions using in the clips
Browsing Session Failure: (Non-Licensed KPI's)
The percentage of failed browsing sessions
Browsing Session Time : (Non-Licensed KPI's):
Presents the average time needed for browsing (download) a webpage

KPI's Mentioned in the license and their Thresholds

Calls	License Target value
Call Blocked Rate	2%
Dropped Call Rate	2%
Speech Voice Quality <2.8	10%
CSFB Call Setup Failure Rate	4%
Data Services	**License Target value**
Session Blocked Rate	10%
Average Session Setup Time	10 Sec
Average http download throughput	2.5 Mbps
Average http upload throughput	1.5 Mbps

Causes Definition will be added

Classification	Definition
2G Coverage	Weak GSM (2G) Coverage
2G Quality	Weak GSM (2G) Quality
3G Coverage	Weak UMTS (3G) Coverage
3G Quality	Weak UMTS (3G) Quality
4G Coverage	Weak LTE (4G) Coverage
4G Quality	Weak LTE (4G) Quality
Core Network	Problem related to core recourses not radio recourses
CSFB Issue	Problem related to transfer the call to lower than LTE (4G) technology
Mobility Issue	Problems related to transfer call from one base station to another
No service	No service
Paging Issue	Problem related to delayed or missing paging
RAN Issue	Problems related to grant the radio access
Other	Timeouts

Thank you